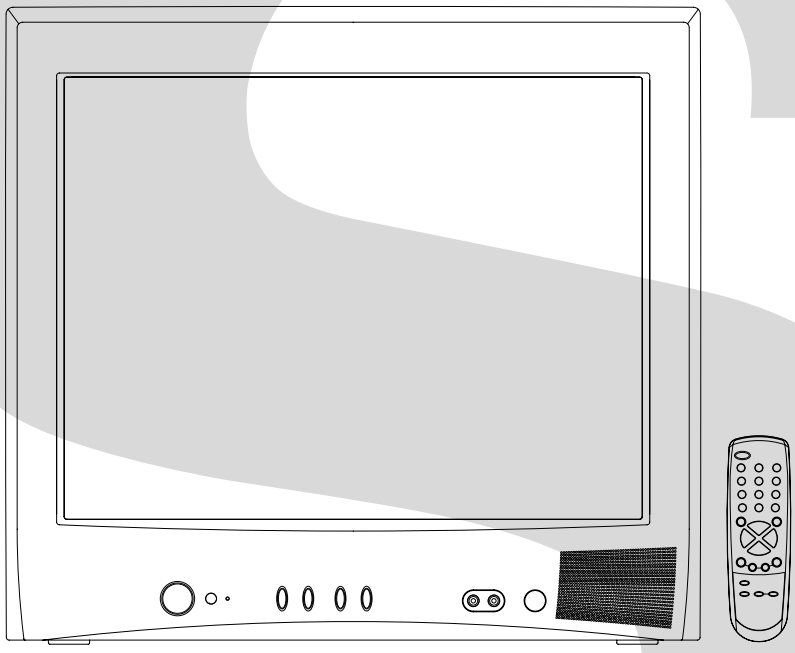
TOSHIBA

FILE NO. 050-200312

SERVICE MANUAL

COLOR TELEVISION

20A23



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SERVICING NOTICES ON CHECKING

1. KEEP THE NOTICES

As for the places which need special attentions, they are indicated with the labels or seals on the cabinet, chassis and parts. Make sure to keep the indications and notices in the operation manual.

2. AVOID AN ELECTRIC SHOCK

There is a high voltage part inside. Avoid an electric shock while the electric current is flowing.

3. USE THE DESIGNATED PARTS

The parts in this equipment have the specific characters of incombustibility and withstand voltage for safety. Therefore, the part which is replaced should be used the part which has the same character.
Especially as to the important parts for safety which is indicated in the circuit diagram or the table of parts as a ⚠ mark, the designated parts must be used.

4. PUT PARTS AND WIRES IN THE ORIGINAL POSITION AFTER ASSEMBLING OR WIRING

There are parts which use the insulation material such as a tube or tape for safety, or which are assembled in the condition that these do not contact with the printed board. The inside wiring is designed not to get closer to the pyrogenic parts and high voltage parts. Therefore, put these parts in the original positions.

5. TAKE CARE TO DEAL WITH THE CATHODE-RAY TUBE

In the condition that an explosion-proof cathode-ray tube is set in this equipment, safety is secured against implosion. However, when removing it or serving from backward, it is dangerous to give a shock. Take enough care to deal with it.

6. AVOID AN X-RAY

Safety is secured against an X-ray by considering about the cathode-ray tube and the high voltage peripheral circuit, etc.
Therefore, when repairing the high voltage peripheral circuit, use the designated parts and make sure not modify the circuit.
Repairing except indicates causes rising of high voltage, and it emits an X-ray from the cathode-ray tube.

7. PERFORM A SAFETY CHECK AFTER SERVICING

Confirm that the screws, parts and wiring which were removed in order to service are put in the original positions, or whether there are the portions which are deteriorated around the serviced places serviced or not. Check the insulation between the antenna terminal or external metal and the AC cord plug blades. And be sure the safety of that.

(INSULATION CHECK PROCEDURE)

1. Unplug the plug from the AC outlet.
2. Remove the antenna terminal on TV and turn on the TV.
3. Insulation resistance between the cord plug terminals and the eternal exposure metal **[Note 2]** should be more than 1M ohm by using the 500V insulation resistance meter **[Note 1]**.
4. If the insulation resistance is less than 1M ohm, the inspection repair should be required.

[Note 1]

If you have not the 500V insulation resistance meter, use a Tester.

[Note 2]

External exposure metal: Antenna terminal
Earphone jack

HOW TO ORDER PARTS

Please include the following informations when you order parts. (Particularly the VERSION LETTER.)

1. MODEL NUMBER and VERSION LETTER
   The MODEL NUMBER can be found on the back of each product and the VERSION LETTER can be found at the end of the SERIAL NUMBER.
2. PART NO. and DESCRIPTION
   You can find it in your SERVICE MANUAL.

IMPORTANT

Inferior silicon grease can damage IC's and transistors.
When replacing an IC's or transistors, use only specified silicon grease (YG6260M).
Remove all old silicon before applying new silicon.

TABLE OF CONTENTS

SERVICING NOTICES ON CHECKING A1-1
HOW TO ORDER PARTS A1-1
IMPORTANT A1-1
TABLE OF CONTENTS A2-1
GENERAL SPECIFICATIONS ..... A3-1~A3-5
DISASSEMBLY INSTRUCTIONS
1. REMOVAL OF ANODE CAP B1-1
2. REMOVAL AND INSTALLATION OF FLAT PACKAGE IC B2-1, B2-2
SERVICE MODE LIST C1-1
CONFIRMATION OF HOURS USED C1-1
WHEN REPLACING EEPROM (MEMORY) IC C1-1
ELECTRICAL ADJUSTMENTS ..... D-1~D-5
BLOCK DIAGRAMS E-1, E-2
PRINTED CIRCUIT BOARDS
MAIN/CRT ..... F-1~F-4
SCHEMATIC DIAGRAMS
MICON/CHROMA/TUNER G-1, G-2
DEFLECTION/CRT G-3, G-4
TV POWER G-5, G-6
SOUND G-7, G-8
AV G-9, G-10
WAVEFORMS H-1, H-2
MECHANICAL EXPLODED VIEWS I-1
MECHANICAL REPLACEMENT PARTS LIST J1-1
ELECTRICAL REPLACEMENT PARTS LIST ..... J2-1~J2-3

GENERAL SPECIFICATIONS

G-1	**TV System**	CRT	CRT Size / Visual Size	20 inch / 508.0mmV
			CRT Type	Normal
			Deflection	90 degree
			Magnetic Field BV/BH	+0.45G/0.18G
		Color System		NTSC
		Speaker		1Speaker
			Position	Front
			Size	1.6 x 2.8 Inch
			Impedance	8 ohm
		Sound Output	MAX	1.5 W
			10%(Typical)	1.0 W
		NTSC3.58+4.43 /PAL60Hz		No
G-2	**Tuning System**	Broadcasting System		US System M
		Tuner and Receive CH	System	1Tuner
			Destination	USA(W/ CATV)
			Tuning System	F-Synth
			Input Impedance	VHF/UHF 75 ohm
			CH Coverage	2 - 69, 4A, A-5 - A-1, A - I, J - W, W+1 - W+84
		Intermediate Frequency	Picture(FP)	45.75MHz
			Sound(FS)	41.25MHz
			FP-FS	4.50MHz
		Preset CH		No
		Stereo/Dual TV Sound		No
		Tuner Sound Muting		Yes
G-3	**Power**	Power Source	AC	120V AC 60Hz
			DC	
		Power Consumption	at AC	
				80 W at AC 120 V 60 Hz
			Stand by (at AC)	5 W at AC 120 V 60 Hz
			Per Year	-- kWh/Year
		Protector	Power Fuse	Yes
G-4	**Regulation**		Safety	UL/CSA
			Radiation	FCC/IC
			X-Radiation	DHHS/HWC
G-5	**Temperature**		Operation	+5oC ~ +40oC
			Storage	-20oC ~ +60oC
G-6	**Operating Humidity**			Less than 80% RH

GENERAL SPECIFICATIONS

G-7	**On Screen Display**	Menu			Yes
		Menu Type			Character
		Picture			Yes
			Contrast		Yes
			Brightness		Yes
			Color		Yes
			Tint		Yes
			Sharpness		Yes
		Audio			No
			Bass		No
			Treble		No
			Balance		No
			BBE On/Off		No
			Stable Sound On/Off		No
			Surround On/Off		No
		CH Set Up			Yes
			TV/CABLE(CATV)		Yes
			Auto CH Memory		Yes
			Add/ Delete		Yes
		Lock			Yes
			CH Lock		Yes
			Video Lock		Yes
			Game Timer		Yes
			Change Password		Yes
		On Timer			Yes
		Language			Yes
		V-chip			Yes
			CH Label		No
			Favorite CH		No
			Color Stream DVD/DTV		No
		Control Level			Yes
			Volume		Yes
			Brightness		Yes
			Contrast		Yes
			Color		Yes
			Tint		Yes
			Sharpness		Yes
			Tuning		No
			Bass		No
			Treble		No
			Balance		No
		Stereo,Audio Output,SAP			No
		Video			Yes
		Color Stream			No
		Channel(TV/Cable)			Yes
		CH Label			No
		Game Timer			Yes
		Sleep Timer			Yes
		Sound Mute			Yes
		V-chip Rating			Yes
		16: 9			No
G-8	**OSD Language**				English French Spanish
G-9	**Clock and Timer**	Sleep Timer	Max Time		120 Min
			Step		10 Min
		On Timer	Program(On Timer)		Yes
		Wake Up Timer			No
		Timer Back-up (at Power Off Mode)	more than		-- Min Sec

GENERAL SPECIFICATIONS

G-10	**Remote Control**	Unit		RC-EH
		Glow in Dark Remocon		Yes
		Format		Toshiba
		Custom Code		40-BF h
		Power Source	Voltage(D.C)	3V
			UM size x pcs	UM-4 x 2 pcs
		Total Keys		27 Keys
		Keys	Power	Yes
			1	Yes
			2	Yes
			3	Yes
			4	Yes
			5	Yes
			6	Yes
			7	Yes
			8	Yes
			9	Yes
			0	Yes
			100	No
			CH Up	Yes
			CH Down	Yes
			Volume Up	Yes
			Volume Down	Yes
			TV/Caption/Text	Yes
			CH1/CH2	Yes
			TV/Video(TV/AV)	Yes
			CH RTN/CH ENT(Quick View)	Yes
			Sleep	Yes
			RE Call(Call)	Yes
			Reset	Yes
			Menu	Yes
			Enter	Yes
			Mute	Yes
			Exit	No
			MTS(Audio Select)	No
			Set +	Yes
			Set -	Yes
			16: 9	No
		Multi Brand Keys	CH Up(VCR)	No
			CH Down(VCR)	No
			Pause/Still	No
			TV/VCR(VCR)	No
			Code	No
			FF	No
			Rew	No
			Rec	No
			Play	No
			Stop	No
			TV	No
			VCR	No
			Cable	No

GENERAL SPECIFICATIONS

G-11	Features	Auto Degauss		Yes
		Auto Shut Off		Yes
		Canal+		No
		CATV		Yes
		Anti-theft		No
		Rental		No
		Memory(Last CH)		Yes
		Memory(Last Volume)		Yes
		V-Chip		Yes
			Type	USA,ORION Type
		BBE		No
		Auto Search		No
		CH Allocation		No
		SAP		No
		Just Clock Function		No
		CH Label		No
		VM Circuit		No
		Full OSD		No
		Premiere		No
		Comb Filter		No
				Lines
		Auto CH Memory		Yes
		Hotel Lock		No
		Closed Caption		Yes
		Stable Sound		No
		FBT Leak Test Protect		Yes
		CH Lock		Yes
		Video Lock		Yes
		Game Timer		Yes
		Energy Star		No
		Favorite CH		No
		Surround		No
		16:9 Mode		No
G-12	Accessories	Owner's Manual	Language	English / French
			W/ Warranty	Yes
		Remote Control Unit		Yes
		Rod Antenna		No
			Poles	
			Terminal	
		Loop Antenna		No
			Terminal	
		U/V Mixer		No
		DC Car Cord (Center+)		No
		Guarantee Card		No
		Warning Sheet		No
		Circuit Diagram		No
		Antenna Change Plug		No
		Service Facility List		No
		Important Safety Instruction		Yes
		Dew/AHC Caution Sheet		No
		AC Plug Adapter		No
		Quick Set-up Sheet		No
		Battery		Yes
			UM size x pcs	UM4 x 2
			OEM Brand	No
		AC Cord		No
		AV Cord (2Pin-1Pin)		No
		Registration Card (NDL Card)		Yes
		ESP Card		Yes
		PTB Sheet		No
		300 ohm to 75 ohm Antenna Adapter		No

GENERAL SPECIFICATIONS

G-13	**Interface**	Switch	Front	Power	Yes
				System Select	No
				Main Power SW	No
				Sub Power	No
				Channel Up/Reset	Yes
				Channel Down/Enter	Yes
				Volume Up/Set Up	Yes
				Volume Down/Set Down	Yes
				MENU=Volume Up+Volume Down	Yes
			Rear	AC/DC	No
				TV/CATV Selector	No
				Degauss	No
				Main Power SW	No
		Indicator		Power	Yes(RED)
				Stand-by	No
				On Timer	No
		Terminals	Front	Video Input	RCA
				Audio Input	RCA x 1
				Other Terminal	No
			Rear	Video Input(Rear1)	No
				Video Input(Rear2)	No
				Audio Input(Rear1)	No
				Audio Input(Rear2)	No
				Video Output	No
				Audio Output	No
				S-Input	No
				Color Stream	No
				Diversity	No
				Ext Speaker	No
				DC Jack 12V(Center +)	No
				VHF/UHF Antenna Input	F Type
				AC Outlet	No
G-14	**Set Size**			Approx. W x D x H (mm)	506.5 x 484 x 464.5
G-15	**Weight**			Net (Approx.)	21.0kg (46.3 lbs)
				Gross (Approx.)	23.8kg (52.5 lbs)
G-16	**Carton**		Master Carton		No
				Content	---- Sets
				Material	-- /--
				Dimensions W x D x H(mm)	-- x -- x --
				Description of Origin	No
			Gift Box		Yes
				Material	Double/Brown
				Dimensions W x D x H(mm)	580 x 575 x 555
				Design	As per Buyer's
				Description of Origin	Yes
			Drop Test		Natural Dropping At 1 Corner / 3 Edges / 6 Surfaces
				Height (cm)	46
			Container Stuffing		320 Sets/40' container
G-17	**Cabinet Material**		Cabinet	Cabinet Front	PS 94V0 DECABROM
				Cabinet Rear	PS 94V0 DECABROM
			PCB	Non-Halogen Demand	No
				Eyelet Demand	Yes

DISASSEMBLY INSTRUCTIONS

1. REMOVAL OF ANODE CAP

Read the following **NOTED** items before starting work.

* After turning the power off there might still be a potential voltage that is very dangerous. When removing the Anode Cap, make sure to discharge the Anode Cap's potential voltage.
* Do not use pliers to loosen or tighten the Anode Cap terminal, this may cause the spring to be damaged.

REMOVAL

1. Follow the steps as follows to discharge the Anode Cap. **(Refer to Fig. 1-1.)**
   Connect one end of an Alligator Clip to the metal part of a flat-blade screwdriver and the other end to ground.
   While holding the plastic part of the insulated Screwdriver, touch the support of the Anode with the tip of the Screwdriver.
   A cracking noise will be heard as the voltage is discharged.

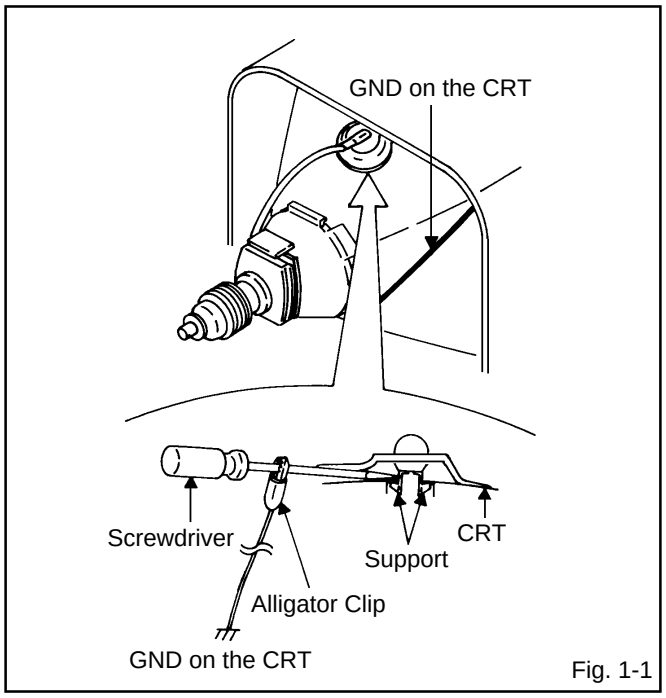


Fig. 1-1

2. Flip up the sides of the Rubber Cap in the direction of the arrow and remove one side of the support. **(Refer to Fig. 1-2.)**

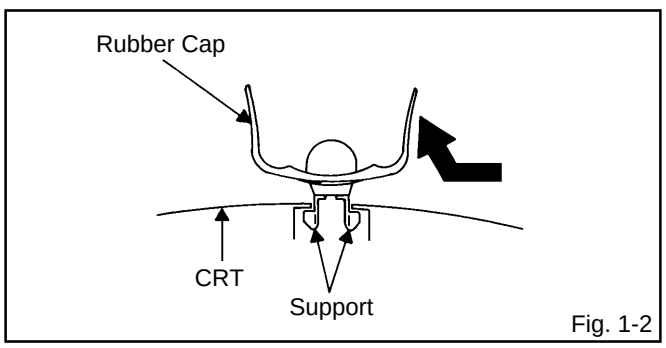


Fig. 1-2

3. After one side is removed, pull in the opposite direction to remove the other.

NOTE

Take care not to damage the Rubber Cap.

INSTALLATION

1. Clean the spot where the cap was located with a small amount of alcohol. **(Refer to Fig. 1-3.)**

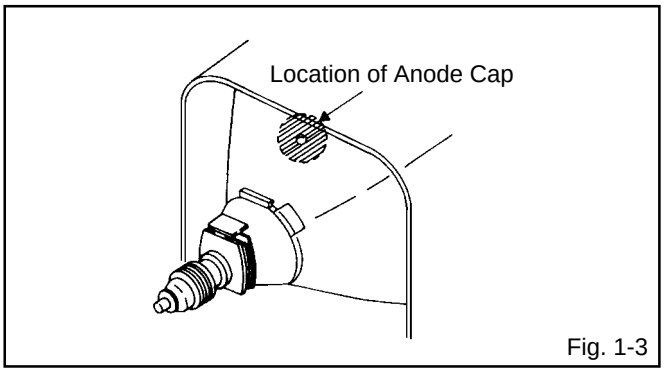


Fig. 1-3

NOTE

Confirm that there is no dirt, dust, etc. at the spot where the cap was located.

2. Arrange the wire of the Anode Cap and make sure the wire is not twisted.
3. Turn over the Rubber Cap. **(Refer to Fig. 1-4.)**

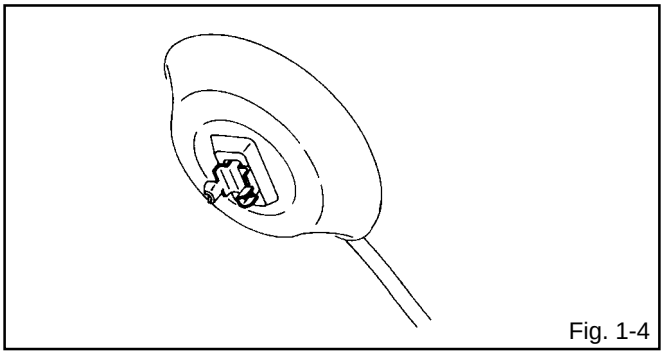


Fig. 1-4

4. Insert one end of the Anode Support into the anode button, then the other as shown in **Fig. 1-5**.

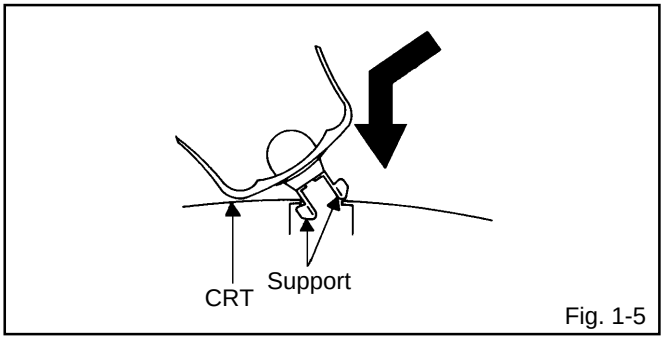


Fig. 1-5

5. Confirm that the Support is securely connected.
6. Put on the Rubber Cap without moving any parts.

DISASSEMBLY INSTRUCTIONS

2. REMOVAL AND INSTALLATION OF FLAT PACKAGE IC

REMOVAL

1. Put the Masking Tape (cotton tape) around the Flat Package IC to protect other parts from any damage. **(Refer to Fig. 2-1.)**

   NOTE

   Masking is carried out on all the parts located within 10 mm distance from IC leads.

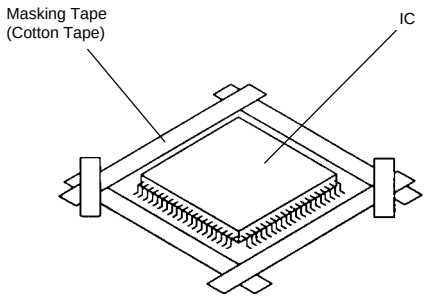


Fig. 2-1

2. Heat the IC leads using a blower type IC desoldering machine. **(Refer to Fig. 2-2.)**

   NOTE

   Do not add the rotating and the back and forth directions force on the IC, until IC can move back and forth easily after desoldering the IC leads completely.

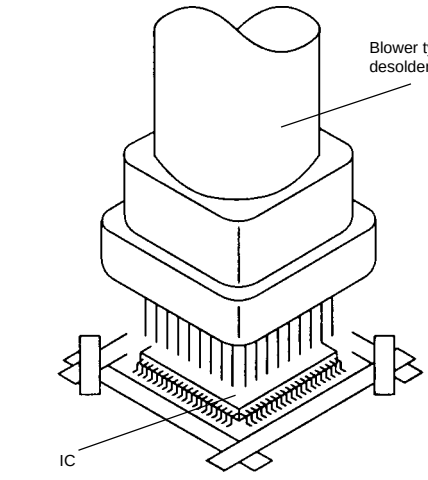


Fig. 2-2

3. When IC starts moving back and forth easily after desoldering completely, pickup the corner of the IC using a tweezers and remove the IC by moving with the IC desoldering machine. **(Refer to Fig. 2-3.)**

   NOTE

   Some ICs on the PCB are affixed with glue, so be careful not to break or damage the foil of each IC leads or solder lands under the IC when removing it.

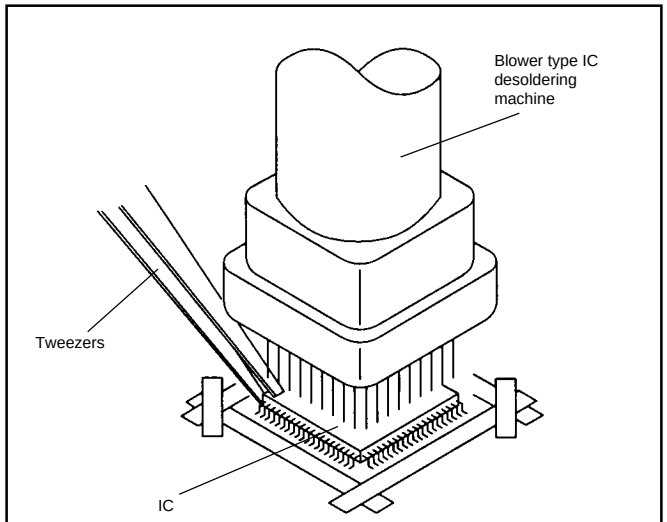


Fig. 2-3

4. Peel off the Masking Tape.

5. Absorb the solder left on the pattern using the Braided Shield Wire. **(Refer to Fig. 2-4.)**

   NOTE

   Do not move the Braided Shield Wire in the vertical direction towards the IC pattern.

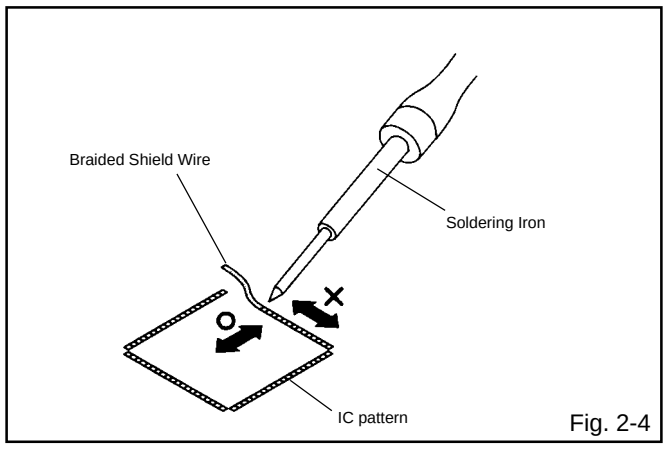


Fig. 2-4

DISASSEMBLY INSTRUCTIONS

INSTALLATION

1. Take care of the polarity of new IC and then install the new IC fitting on the printed circuit pattern. Then solder each lead on the diagonal positions of IC temporarily. **(Refer to Fig. 2-5.)**

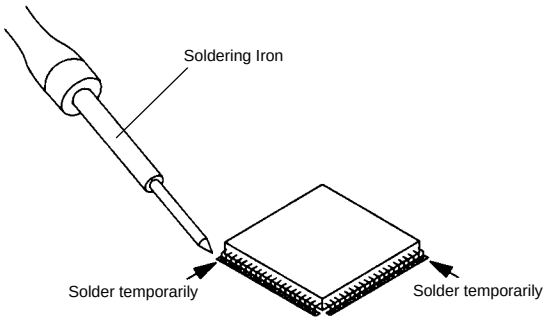


Fig. 2-5

2. Supply the solder from the upper position of IC leads sliding to the lower position of the IC leads. **(Refer to Fig. 2-6.)**

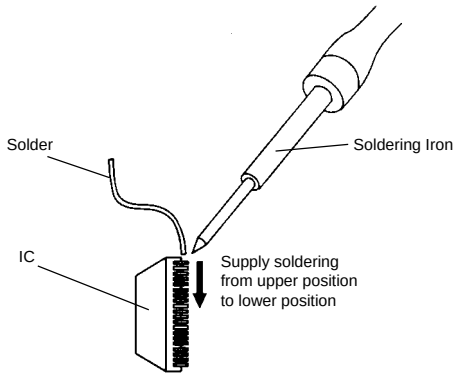


Fig. 2-6

3. Absorb the solder left on the lead using the Braided Shield Wire. **(Refer to Fig. 2-7.)**

   NOTE

   Do not absorb the solder to excess.

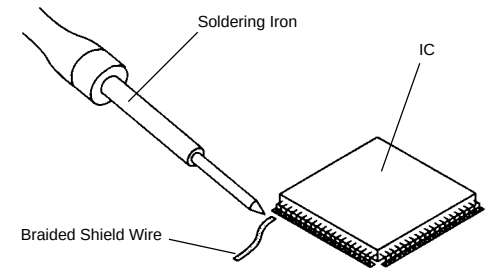


Fig. 2-7

4. When bridge-soldering between terminals and/or the soldering amount are not enough, resolder using a Thin-tip Soldering Iron. **(Refer to Fig. 2-8.)**

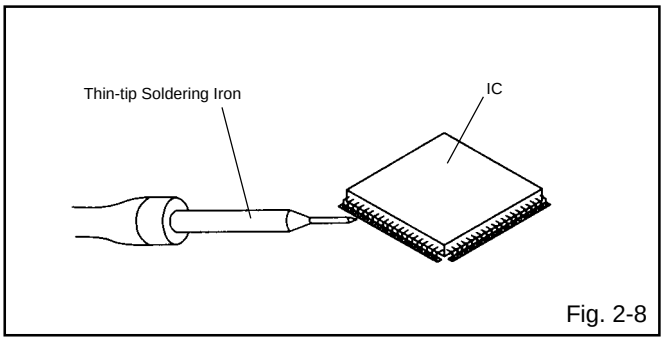


Fig. 2-8

5. Finally, confirm the soldering status on four sides of the IC using a magnifying glass.
   Confirm that no abnormality is found on the soldering position and installation position of the parts around the IC. If some abnormality is found, correct by resoldering.

   NOTE

   When the IC leads are bent during soldering and/or repairing, do not repair the bending of leads. If the bending of leads are repaired, the pattern may be damaged. So, be always sure to replace the IC in this case.

SERVICE MODE LIST

This unit provided with the following SERVICE MODES so you can repair, examine and adjust easily.
To enter the Service Mode, press both set key and remote control key for more than 1 second.

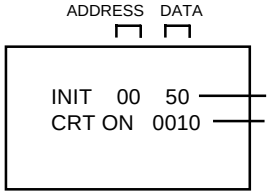
Set Key	Remocon Key	Operations
VOL. (-) MIN	0	Releasing of V-CHIP PASSWORD and LOCK PASSWORD.
VOL. (-) MIN	1	Initialization of the factory. NOTE: Do not use this for the normal servicing. If you set a factory initialization, the memories are reset such as the channel setting, and the POWER ON total hours.
VOL. (-) MIN	6	POWER ON total hours is displayed on the screen. Refer to the "CONFIRMATION OF HOURS USED". Can be checked of the INITIAL DATA of MEMORY IC. Refer to the "WHEN REPLACING EEPROM (MEMORY) IC".
VOL. (-) MIN	8	Writing of EEPROM initial data. NOTE: Do not use this for the normal servicing.
VOL. (-) MIN	9	Display of the Adjustment MENU on the screen. Refer to the "ELECTRICAL ADJUSTMENT" (On-Screen Display Adjustment).

CONFIRMATION OF HOURS USED

POWER ON total hours can be checked on the screen. Total hours are displayed in 16 system of notation.

NOTE: If you set a factory initialization, the total hours is reset to "0".

1. Set the VOLUME to minimum.
2. Press both VOL. DOWN button on the set and Channel button **(6)** on the remote control for more than 1 second.
3. After the confirmation of using hours, turn off the power.



Initial setting content of MEMORY IC.
POWER ON total hours.
= (16 x 16 x 16 x thousands digit value)
+ (16 x 16 x hundreds digit value)
+ (16 x tens digit value)
+ (ones digit value)

FIG. 1

WHEN REPLACING EEPROM (MEMORY) IC

If a service repair is undertaken where it has been required to change the MEMORY IC, the following steps should be taken to ensure correct data settings while making reference to TABLE 1.

NOTE: No need setting for after INI 0F due to the adjustment value.

INI	+0	+1	+2	+3	+4	+5	+6	+7	+8	+9	+A	+B	+C	+D	+E	+F
00	50	04	4A	4C	07	B3	24	69	09	00	AA	10	90	4F	00	02

Table 1

1. Enter DATA SET mode by setting VOLUME to minimum.
2. Press both VOL. DOWN button on the set and Channel button **(6)** on the remote control for more than 1 second. ADDRESS and DATA should appear as FIG 1.
3. ADDRESS is now selected and should "blink". Using the SET +/- button on the remote, step through the ADDRESS until required ADDRESS to be changed is reached.
4. Press ENTER to select DATA. When DATA is selected, it will "blink".
5. Again, step through the DATA using SET +/- button until required DATA value has been selected.
6. Pressing ENTER will take you back to ADDRESS for further selection if necessary.
7. Repeat steps 3 to 6 until all data has been checked.
8. When satisfied correct DATA has been entered, turn POWER off (return to STANDBY MODE) to finish DATA input. **After the data input, set to the initializing of shipping.**
9. Turn POWER on.
10. Press both VOL. DOWN button on the set and Channel button **(1)** on the remote control for more than 1 second.
11. After the finishing of the initializing of shipping, the unit will turn off automatically.

The unit will now have the correct DATA for the new MEMORY IC.

ELECTRICAL ADJUSTMENTS

1. ADJUSTMENT PROCEDURE

Read and perform these adjustments when repairing the circuits or replacing electrical parts or PCB assemblies.

CAUTION

- Use an isolation transformer when performing any service on this chassis.
- Before removing the anode cap, discharge electricity because it contains high voltage.
- When removing a PCB or related component, after unfastening or changing a wire, be sure to put the wire back in its original position.
- When you exchange IC and Transistor for a heat sink, apply the silicon grease on the contact section of the heat sink. Before applying new silicon grease, remove all the old silicon grease. (Old grease may cause damages to the IC and Transistor.)

Prepare the following measurement tools for electrical adjustments.

1. Oscilloscope
2. Digital Voltmeter
3. Pattern Generator

On-Screen Display Adjustment

1. In the condition of NO indication on the screen. Press the VOL. DOWN button on the set and the Channel button **(9)** on the remote control for more than 1 second to appear the adjustment mode on the screen as shown in **Fig. 1-1**.

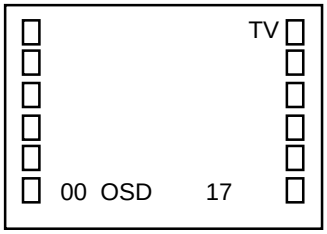


Fig. 1-1

3. Use the Channel UP/DOWN button or Channel button **(0-9)** on the remote control to select the options shown in **Fig. 1-2**.
4. Press the MENU button on the remote control to end the adjustments.

NO.	FUNCTION	NO.	FUNCTION
00	OSD H	17	CONTRAST MAX
01	CUT OFF	18	CONTRAST MIN
04	H.VCO	19	COLOR CENT
05	H.PHAS	20	COLOR MAX
06	V.SIZE	21	COLOR MIN
07	V.SHIFT	22	TINT
08	R.DRIVE	23	SHARPNESS
09	B.DRIVE	24	FM LEVEL
10	R.BIAS	25	LEVEL
11	G.BIAS	26	SEPARATION 1
12	B.BIAS	27	SEPARATION 2
13	BRIGHT CENT	28	TEST MONO
14	BRIGHT MAX	29	TEST STEREO
15	BRIGHT MIN	30	X-RAY TEST
16	CONTRAST CENT		

Fig. 1-2

2. BASIC ADJUSTMENTS

2-1: CONSTANT VOLTAGE

1. Set condition is AV MODE without signal.
2. Connect the digital voltmeter to the **TP402**.
3. Adjust the **VR502** until the digital voltmeter is 117 ± 1V.

2-2: CUT OFF

1. Adjust the unit to the following settings. R.DRIVE=10, G.DRIVE=10, R.BIAS=64, G.BIAS=64, B.BIAS=64, BRI CENT=130, CONT MAX=80.
2. Place the set with Aging Test for more than 15 minutes.
3. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(01)** on the remote control to select "CUT OFF".
4. Adjust the **Screen Volume** until a dim raster is obtained.

2-3: WHITE BALANCE

NOTE: Adjust after performing CUT OFF adjustment.

1. Place the set with Aging Test for more than 10 minutes.
2. Receive the gray scale pattern from the Pattern Generator.
3. Using the remote control, set the brightness and contrast to normal position.
4. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(10)** on the remote control to select “R. BIAS”.
5. Press the CH. UP/DOWN button on the remote control to select the “R. BIAS”, “G. BIAS”, “B. BIAS”, “R. DRIVE” or “B. DRIVE”.
6. Adjust the VOL. UP/DOWN button on the remote control to whiten the R. BIAS, G. BIAS, B. BIAS, R. DRIVE, and B. DRIVE at each step tone sections equally.
7. Perform the above adjustments 5 and 6 until the white color is looked like a white.

2-4: FOCUS

1. Receive the monoscope pattern.
2. Turn the Focus Volume fully counterclockwise once.
3. Adjust the **Focus Volume** until picture is distinct.

2-5: HORIZONTAL PHASE

1. Receive the monoscope pattern.
2. Using the remote control, set the brightness and contrast to normal position.
3. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(05)** on the remote control to select “H. PHAS”.
4. Press the VOL. UP/DOWN button on the remote control until the SHIFT quantity of the OVER SCAN on right and left becomes minimum.

ELECTRICAL ADJUSTMENTS

2-6: VERTICAL SHIFT

1. Receive the monoscope pattern.
2. Using the remote control, set the brightness and contrast to normal position.
3. Check if the step No. of V. SHIFT is "02".
4. Adjust the **VR401** until the horizontal line becomes fit to the notch of the shadow mask.

2-7: VERTICAL SIZE

1. Receive the monoscope pattern.
2. Using the remote control, set the brightness and contrast to normal position.
3. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(06)** on the remote control to select “V. SIZE”.
4. Press the VOL. UP/DOWN button on the remote control until the SHIFT quantity of the OVER SCAN on upside and downside becomes 10 ± 2%.

2-8: VERTICAL LINEARITY

NOTE: Adjust after performing adjustments in section 2-7. After the adjustment of Vertical Linearity, reconfirm the Vertical Shift and Vertical Size adjustments.

1. Receive the monoscope pattern.
2. Using the remote control, set the brightness and contrast to normal position.
3. Adjust the **VR402** until the SHIFT quantity of the OVER SCAN on upside and downside becomes minimum.

2-9: OSD HORIZONTAL

1. Activate the adjustment mode display of **Fig. 1-1**.
2. Press the VOL. UP/DOWN button on the remote control until the difference of A and B becomes minimum. **(Refer to Fig. 2-1)**

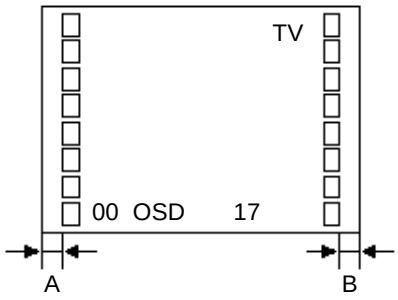


Fig. 2-1

2-10: BRIGHTNESS

1. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(13)** on the remote control to select "BRI CENT".
2. Press the VOL. UP/DOWN button on the remote control until the brightness step No. becomes “130”.
3. Receive a broadcast and check if the picture is normal.
4. Press the TV/VIDEO button on the remote control to set to the AV mode. Then perform the above adjustments 1~3.

2-11: SUB CONTRAST

1. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(17)** on the remote control to select “CONT. MAX”.
2. Press the VOL. UP/DOWN button on the remote control until the contrast step No. becomes “80”.
3. Receive a broadcast and check if the picture is normal.
4. Press the TV/VIDEO button on the remote control to set to the AV mode. Then perform the above adjustments 1~3.

2-12: SUB TINT/SUB COLOR

1. Receive the color bar pattern.
2. Connect the oscilloscope to **TP024**.
3. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(22)** on the remote control to select "TINT".
4. Press the VOL. UP/DOWN button on the remote control until the section "A" becomes as straight line **(Refer to Fig. 2-2)**
5. Connect the oscilloscope to **TP022**.
6. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(19)** on the remote control to select "COL.CENT".
7. Adjust the VOLTS RANGE VARIABLE knob of the oscilloscope until the range between white 100% and 0% is set to 4 scales
8. Press the VOL. UP/DOWN button on the remote control until the red color level is adjusted to 110% of the white level. **(Refer to Fig. 2-3)**
9. Receive the color bar pattern. (Audio Video Input)
10. Press the TV/VIDEO button on the remote control to set to the AV mode. Then perform the above adjustments 2~8.

ELECTRICAL ADJUSTMENTS

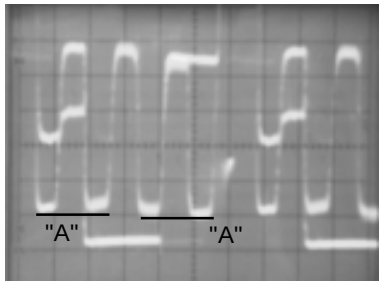


Fig. 2-2

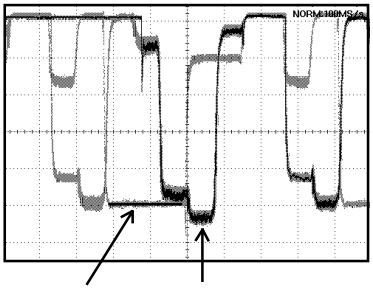


Fig. 2-3

2-13: Confirmation of Fixed Value (Step No.)

Please check if the fixed values of the each adjustment items are set correctly referring below. (RF/AV)

NO.	FUNCTION	STEP NO.
04	H VCO	04
14	BRIGHT MAX	170
15	BRIGHT MIN	60
16	CONT CENT	40
18	CONT MIN	20
20	COLOR MAX	70
21	COLOR MIN	00
23	SHARPNESS	43
24	FM LEVEL	00
28	TEST MONO	00
29	TEST STERIO	00

ELECTRICAL ADJUSTMENTS

3. PURITY AND CONVERGENCE ADJUSTMENTS

NOTE

1. Turn the unit on and let it warm up for at least 30 minutes before performing the following adjustments.
2. Place the CRT surface facing east or west to reduce the terrestrial magnetism.
3. Turn ON the unit and demagnetize with a Degauss Coil.

3-1: STATIC CONVERGENCE (ROUGH ADJUSTMENT)

1. Tighten the screw for the magnet. Refer to the adjusted CRT for the position. **(Refer to Fig. 3-1)**
   If the deflection yoke and magnet are in one body, untighten the screw for the body.
2. Receive the green raster pattern from the color bar generator.
3. Slide the deflection yoke until it touches the funnel side of the CRT.
4. Adjust center of screen to green, with red and blue on the sides, using the pair of purity magnets.
5. Switch the color bar generator from the green raster pattern to the crosshatch pattern.
6. Combine red and blue of the 3 color crosshatch pattern on the center of the screen by adjusting the pair of 4 pole magnets.
7. Combine red/blue (magenta) and green by adjusting the pair of 6 pole magnets.
8. Adjust the crosshatch pattern to change to white by repeating steps 6 and 7.

3-2: PURITY

NOTE

Adjust after performing adjustments in section 3-1.

1. Receive the green raster pattern from color bar generator.
2. Adjust the pair of purity magnets to center the color on the screen.
   Adjust the pair of purity magnets so the color at the ends are equally wide.
3. Move the deflection yoke backward (to neck side) slowly, and stop it at the position when the whole screen is green.
4. Confirm red and blue color.
5. Adjust the slant of the deflection yoke while watching the screen, then tighten the fixing screw.

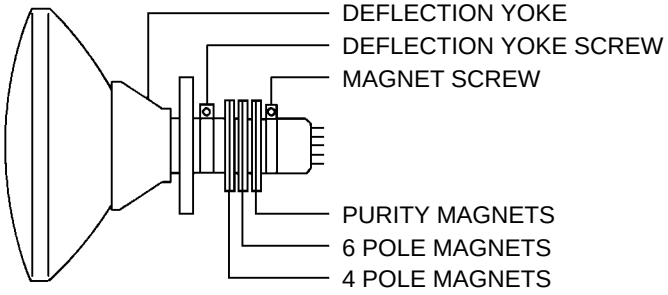


Fig. 3-1

3-3: STATIC CONVERGENCE

NOTE

Adjust after performing adjustments in section 3-2.

1. Receive the crosshatch pattern from the color bar generator.
2. Combine red and blue of the 3 color crosshatch pattern on the center of the screen by adjusting the pair of 4 pole magnets.
3. Combine red/blue (magenta) and green by adjusting the pair of 6 pole magnets.

3-4: DYNAMIC CONVERGENCE

NOTE

Adjust after performing adjustments in section 3-3.

1. Adjust the differences around the screen by moving the deflection yoke upward/downward and right/left. **(Refer to Fig. 3-2-a)**
2. Insert three wedges between the deflection yoke and CRT funnel to fix the deflection yoke. **(Refer to Fig. 3-2-b)**

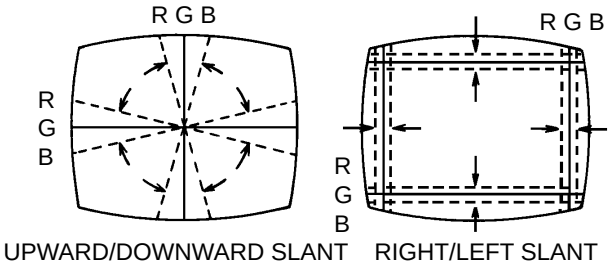
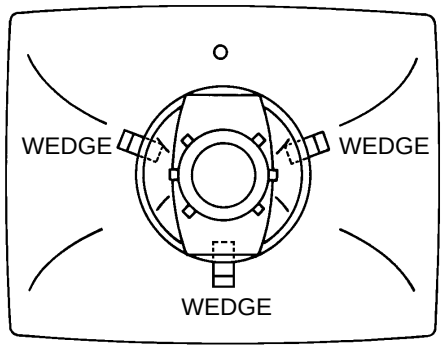


Fig. 3-2-a

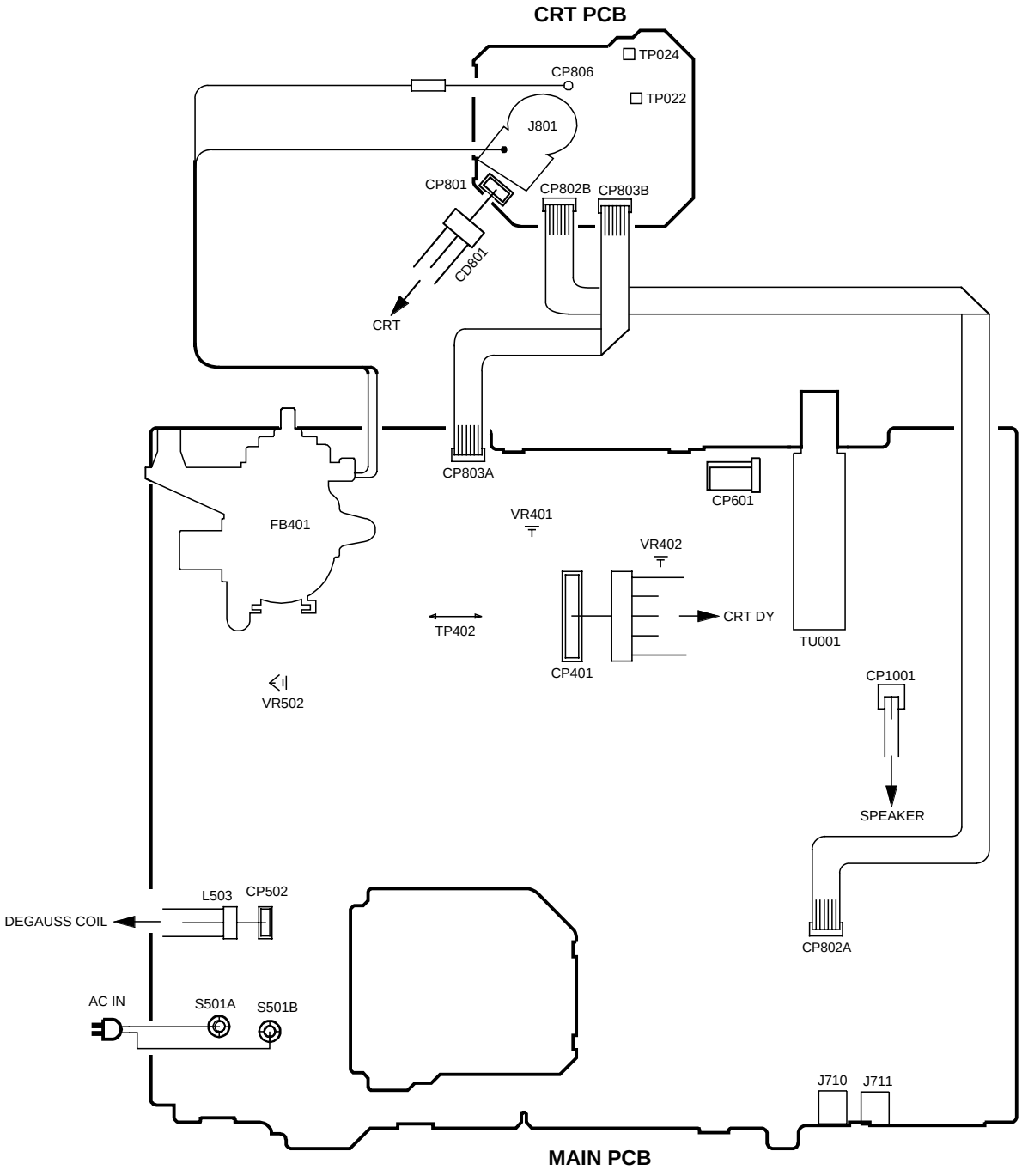


WEDGE POSITION

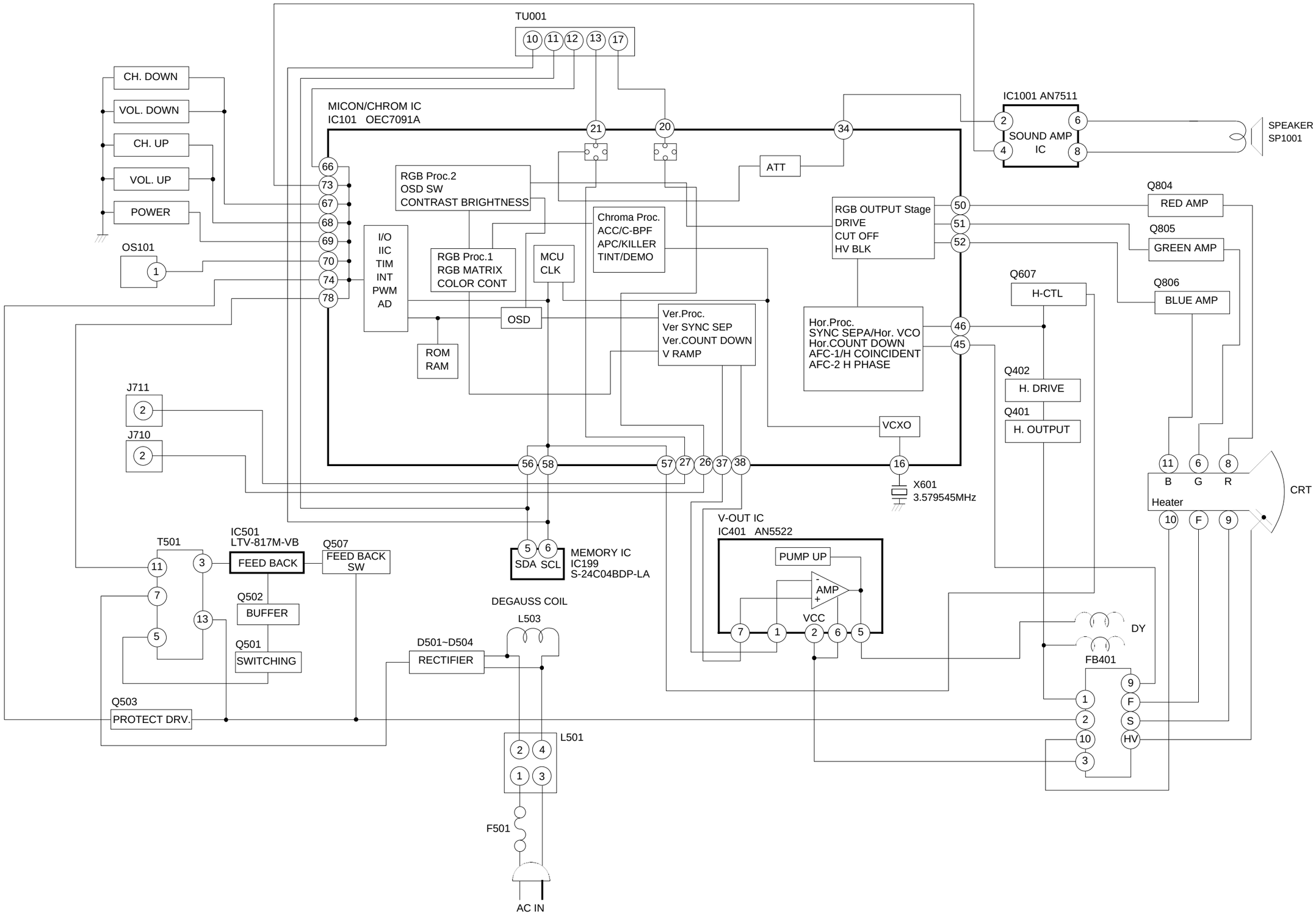
Fig. 3-2-b

ELECTRICAL ADJUSTMENTS

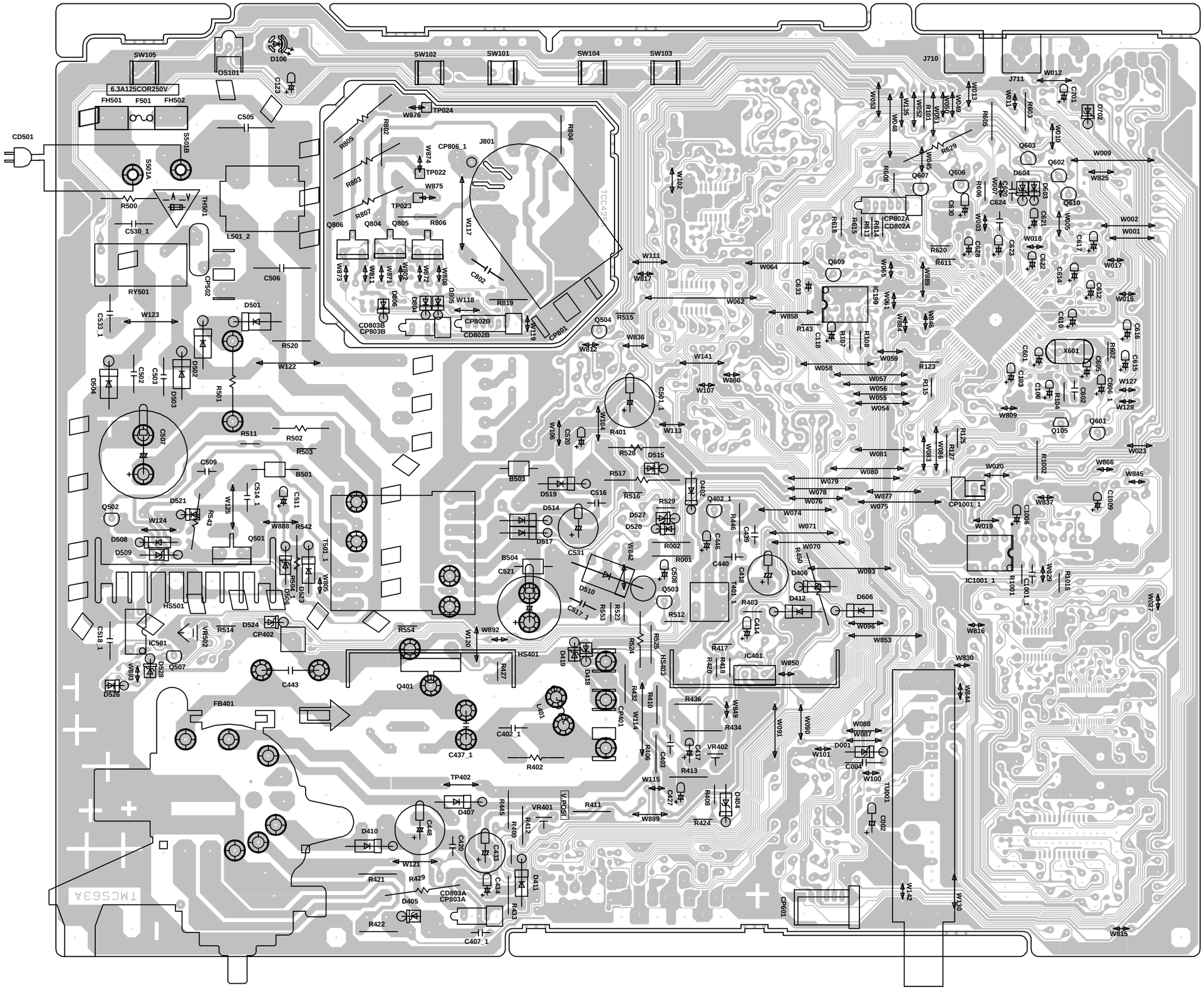
4. ELECTRICAL ADJUSTMENT PARTS LOCATION GUIDE (WIRING CONNECTION)



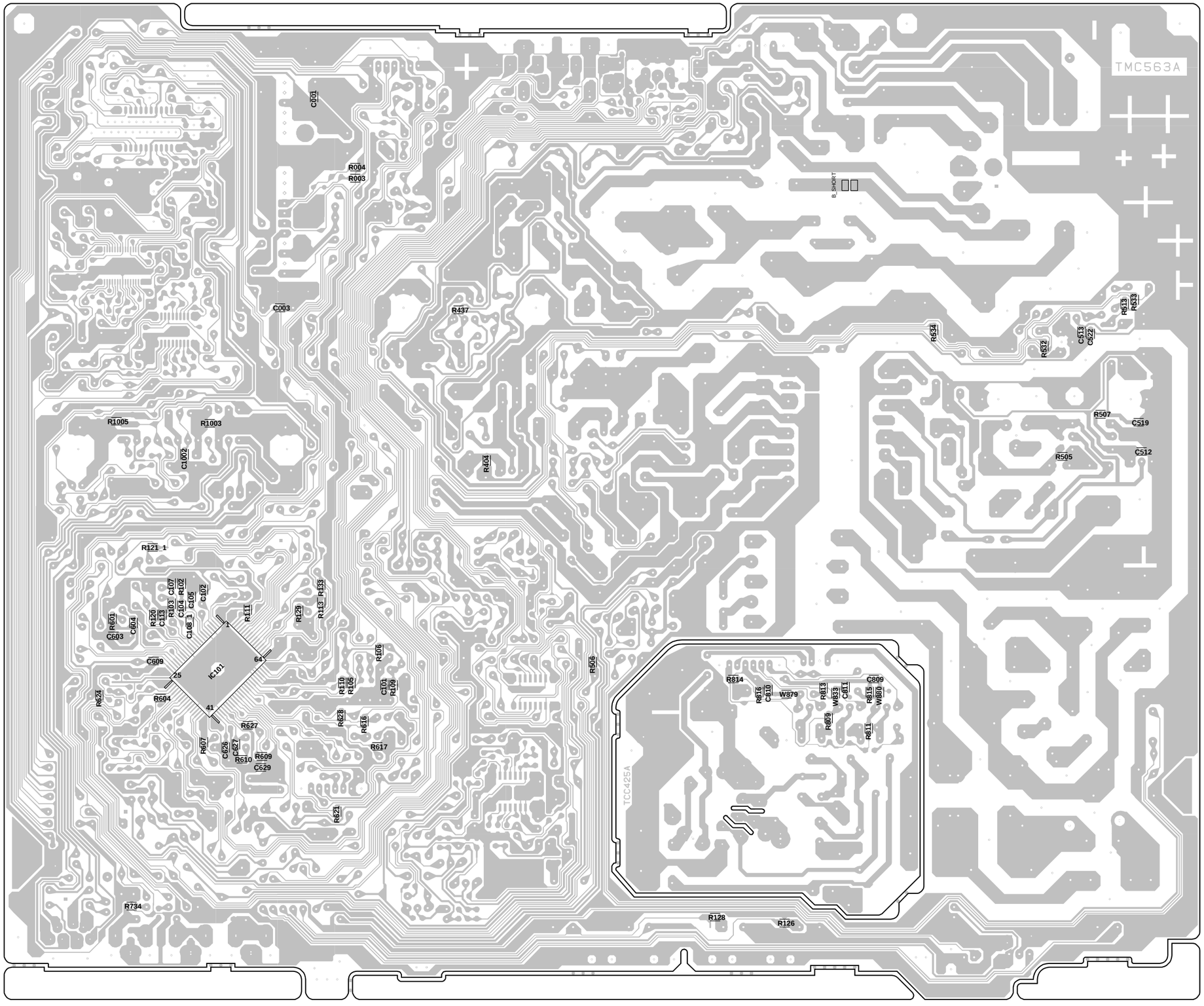
BLOCK DIAGRAM



PRINTED CIRCUIT BOARDS
MAIN/CRT (INSERTED PARTS)
SOLDER SIDE



PRINTED CIRCUIT BOARDS
MAIN/CRT (CHIP MOUNTED PARTS)
SOLDER SIDE



MICON/CHROMA/TUNER SCHEMATIC DIAGRAM
(MAIN PCB)

1	CNVSS	41	NC
2	XIN	42	HVCO F/B
3	XOUT	43	AFC FILTER
4	TEST1	44	DEF GND
5	VSS	45	FBP IN
6	MCU VCC	46	H OUT
7	TEST0	47	DEF VCC
8	FILT	48	NC
9	HLT	49	HI VCC
10	VHOLD	50	R OUT
11	CVIN	51	G OUT
12	RESET IN	52	B OUT
13	MCU RESET OUT	53	ACL
14	Y SW OUT	54	NC
15	V/C GND	55	PROTECT
16	3.58 XTAL	56	SDA
17	C-APC	57	H_CTL
18	MCU5.7V REG OUT	58	SCL
19	NC	59	NC
20	CVBS IN3	60	NC
21	AUDIO IN3	61	NC
22	V/C VCC	62	DEGAUSS_H
23	MCU TEST	63	STANDBY_H
24	CVBS IN2	64	VOLUME
25	AUDIO IN2	65	NC
26	CVBS IN1	66	AFT
27	AUDIO IN1	67	KEY1
28	5.7V REG OUT	68	KEY2
29	C(Y/C) IN	69	POWER_ON
30	Y(Y/C) IN	70	REMOCON
31	VREG VCC	71	AV2
32	FSC OUT	72	AV1
33	MONITOR OUT	73	AUDIO_MUTE
34	AUDIO ATT OUT	74	X-RAY
35	AUDIO ATT FILTER	75	IIC_OFF
36	TEST3	76	ON_TIMER
37	V RAMP F/B	77	BBE
38	V RAMP OUT	78	POWER FAIL
39	V RAMP CAP	79	X-RAY_TEST
40	8.7V REG OUT	80	EXT_MUTE

NOTE: THIS SCHEMATIC DIAGRAM IS THE LATEST AT THE TIME OF PRINTING AND SUBJECT TO CHANGE WITHOUT NOTICE 。

NOTE: THE DC VOLTAGE AT EACH PART WAS MEASURED WITH THE DIGITAL TESTER WHEN THE COLOR BROADCAST WAS RECEIVED IN GOOD CONDITION AND PICTURE IS NORMAL.

CAUTION SINCE THESE PARTS MARKED BY ⚠ ARE CRITICAL FOR SAFETY,USE ONES DESCRIBED IN PARTS LIST ONLY 。

ATTENTION: LES PIECES REPAREES PAR UN ⚠ ETANT DANGEREUSES AN POINT DE VUE SECURITE N'UTILISER QUE CELLS DECRITES DANS LA NOMENCLATURE DES PIECES。

CAUTION: DIGITAL TRANSISTOR

LUMINANCE SIGNAL
DEFLECTION SIGNAL
AUDIO SIGNAL
TUNER VIDEO SIGNAL
R.SIGNAL
G.SIGNAL
B.SIGNAL

DEFLECTION/CRT SCHEMATIC DIAGRAM (MAIN PCB)

FROM/TO MICON/CHROMA/TUNER
CLAMP
CLAMP_OFF
G.OUT
R.OUT
B.OUT
V_FEEDBACK
V_OUT
ABCL
H_SYNC
H_OUT
GND
X-RAY

V-OUT IC IC401 AN5522
THERMAL PROTECTION
PUMP UP
AMP
VCC GND
3.7 25.4 1.3 0 12.8 25.8 3.7
R437 4.7K
R403 1K 1/4W
D412 11E1-EIC
C414 35V 100 YK

CP802A B2013H02-6P
CP802B B2013H02-6P
CP803A B2013H02-4P
CP803B B2013H02-4P
CD801 SM1098-009-1A
CP801 A2361WV2-2P
R819 10 1/2W
V801 A51AEZ90X24

D804 1SS133 R809 3.9K
D805 1SS133 R814 3.9K
D806 1SS133 R811 3.9K
W871 W872 W873
W802 C811 390P CH W833 R813 470
W808 C810 330P CH R816 470
W811 C809 390P CH W880 R815 470
5.9 130.6 6.3
RED AMP Q804 KTC4217
GREEN AMP Q805 KTC4217
BLUE AMP Q806 KTC4217
TP022 TP023 TP024
W874 R803 12K 2W
R802 2.7K 1/4W
W875 R807 12K 2W
R806 2.7K 1/4W
W876 R805 12K 2W
R804 2.7K 1/4W

R418 39K +-1%
R420 15K +-1%
R432 680 1/2W
R410 680 1/2W
R411 1K 1/2W
D418 MTZJ30B
D419 MTZJ30B
C418 25V 1000 YK
C403 100V 0.22 MMTS
C427 50V 10 YK
R412 470 1/2W
R433 470 1/2W
R434 2.2 1/2W
R436 2.2 1/2W
R406 1 1/2W
R413 1.8K 1/2W
W824 V.LIN. VR402 47K METAL
C417 50V 3.3 YK
W825 V.POSI VR401 METAL 1K
R417 22K +-1%
HS403 763WSAA013
W850 W853
D404 MTZJ5.1B
R408 4.7K +-1%
R424 18K +-1%
R409 15K +-1%
C434 100V 22 YK
D411 1N4937
W899

CP401 A1561WV2-A5P
C433 35V 470 YK
R429 1.8 2W

T401_1 ETH09K14BZ
C439 500V 22P SL
C440 100V 0.01 MMTS
L401 ELH5L4113
R402 1K 1W
C437_1 250V 0.33 ECWF
C402_1 2KV 0.001 RR
H.OUTPUT Q401 2SD2499 114.0
C443 1.25KV 0.0091 MPP
R427 100 1/4W
CP402 003P-2100

FROM/TO SOUND
HS401 763WSAA013
GND
R404 1K
H.DRIVE Q402_1 2SC1627_Y 27.0 0.3 0
R446 470 1/2W
C407_1 100P CH
D405 MTZJ6.2B
C446 50V 22 YK
R422 6.8K 1/2W
+B
TP402
B_SHORT

FB401 3221012F
289 COL
118.1 E180
115.0 B+
46.1 AFC
7.3 HEATER
0 GND
40.1 NC E12
63.9 E27
0 GND
22.8 NC E8
HV F S GND ABL 3.6
D410 1N4937
D407 1N4937
C448 250V 22 YK
C420 100V 0.1 MMTS
R421 68K 1/4W

FOCUS
SCREEN
CP806_1
C802 2KV 0.001 B
J801 ISHS53S
96.4 NC 6.4 101.6 99.6 0

FROM TV POWER
+B
GND
UNREG+12V
R445 150K 1/2W
R401 220 1W
D402 11E1-B-EIC
D406 11E1-EIC
R450 180 2W

PCB110 TCC425
PCB010 TMC563

NOTE: THIS SCHEMATIC DIAGRAM IS THE LATEST AT THE TIME OF PRINTING AND SUBJECT TO CHANGE WITHOUT NOTICE 。

NOTE: THE DC VOLTAGE AT EACH PART WAS MEASURED WITH THE DIGITAL TESTER WHEN THE COLOR BROADCAST WAS RECEIVED IN GOOD CONDITION AND PICTURE IS NORMAL.

NOTE: THE RESISTOR MARKED F IS FUSE RESISTOR. THE ALUMI ELECTROLYTIC CAPACITOR MARKED NP IS NON POLAR ONE.

ATTENTION: LES PIECES REPAREES PAR UN ⚠ ETANT DANGEREUSES AN POINT DE VUE SECURITE N'UTILISER QUE CELLS DECRITES DANS LA NOMENCLATURE DES PIECES。

CAUTION SINCE THESE PARTS MARKED BY ⚠ ARE CRITICAL FOR SAFETY. USE ONES DESCRIBED IN PARTS LIST ONLY 。

R.SIGNAL
G.SIGNAL
B.SIGNAL
DEFLECTION SIGNAL

TV POWER SCHEMATIC DIAGRAM
(MAIN PCB)

W836
W812
W817
RELAY DRIVE
Q504
KTC3198
R515
10K 1/4W
RY501
ALKS321
DEGAUSS COIL
L503
8R200026
CP502
A1561WV2-2P
TH501
B59203-S1060-B14
R500
2.7M 1/2W +-10%
C533_1
250V 0.001 KX
C530_1
250V 0.001 KX
R520
1.5M 1/2W
C506
275V 0.1 ECQUL
R501
1.2 7W
R502
0.22 1W
D501
RM11C-EIC
D502
RM11C-EIC
C502
2KV 0.001 B
C503
2KV 0.001 B
C507
200V 330 UP
R503
1.2M 1/4W
R511
1.2M 1/4W
D504
RM11C-EIC
D503
RM11C-EIC
D509
MTZJ18B
T501_1
81291144
131.7
143.1
NC
143.1
NC
12.1
0
15.2
P1
P2
B501
W5RH3.5X5X1.0
SWTCHING
Q501
STPSNC50FP
144.0
4.8
0.1
R543
330 2W
C509
0.047 M
C514_1
2KV 680PRR
C518_1
250V 0.0022 KX
W805
D508
1SS133
R507
150
C519
0.01 B
D523
1N4937
R504_1
1K 1/4W
C511
25V 47 YK
D506
MTZJ18B
D521
1SS133
W808
R505
270
BUFFER
Q502
KTC3203_Y
4.8
0.1
0
R542
0.27 1W
C512
0.01 B
HS501
763WAA0023
FEED BACK
IC501
LTV-817M-VB
B503
W5RH3.5X5X1.0
C516
500V 0.001 B
D519
SB290S
R517
3.3 3W
D515
1SS133
C501_1
16V 1000 YK
D526
1SS133
B504
W5RH3.5X5X1.0
W893
D510
30DF6-FC
C517_1
2KV 0.0018 RR
R524
1 2W
PROTECT DRIVE
Q503
2SA1624
C521
160V 100
C508
100V 4.7
R523
47K 1/4W
R525
10K 1/4W
R512
10K 1/4W
D520
1SS133
D514
SB140-EIC
D517
1N4937
R516
100 1/4W
C520
50V 22 YK
R528
3.3K 1/4W
D527
MTZJ5.1B
R529
22K 1/4W
C531
16V 1000 YK
R513
100
D524
MTZJ3.9B
W892
R533
470
R532
1.5K
R534
100
C513
0.0027 B
FEED BACK
SWITCHING
Q507
KTC3198
D528
MTZJ5.6B
C522
0.033 B
+B ADJ
VR502
1K
R553
5.6K 1/4W
R554
100K 1/4W
R514
5.6K 1/4W
R506
22K
W842
COIL,LINE FILTER
L501_2
1R0A562F20
C505
275V 0.22 ECQUL
FH502
EYF-528C
F501
6.3A125V
6.3A125V
FH501
EYF-528C
AC120V_60Hz
CD501
0R415906
BLACK
WHITE
BLADE
WIDE
S501A
S501B
6.3A 125V

TO MICOM/CHROMA/TUNER
REMOTE+12V
UNREG+12V
TO DEFLECTION/CRT
GND
+B
UNREG+12V
TO SOUND
SOUND+B
GND
SOUND_GND
FROM/TO AV
GND
FROM/TO MICON/CHROMA/TUNER
X-RAY
POWER_FAIL
GND
TU+BT
DEGAUSS_H
P.CON+5V

PCB010
TMC563

CAUTION: FOR CONTINUED PROTECTION AGAINST FIRE HAZARD, REPLACE ONLY WITH THE SAME TYPE FUSE 6.3A 125V(F501).

ATTENTION: POUR UNE PROTECTION CONTINUE LES RISQUES D'INCEIE N'UTOLISER QUE DES FUSIBLE DE MEME TYPE 6.3A 125V(F501).

CAUTION: ⏚ IS THE LIVE CONNECTION

NOTE: THE RESISTOR MARKED F IS FUSE RESISTOR. THE ALUMI ELECTROLYTIC CAPACITOR MARKED NP IS NON POLAR ONE.

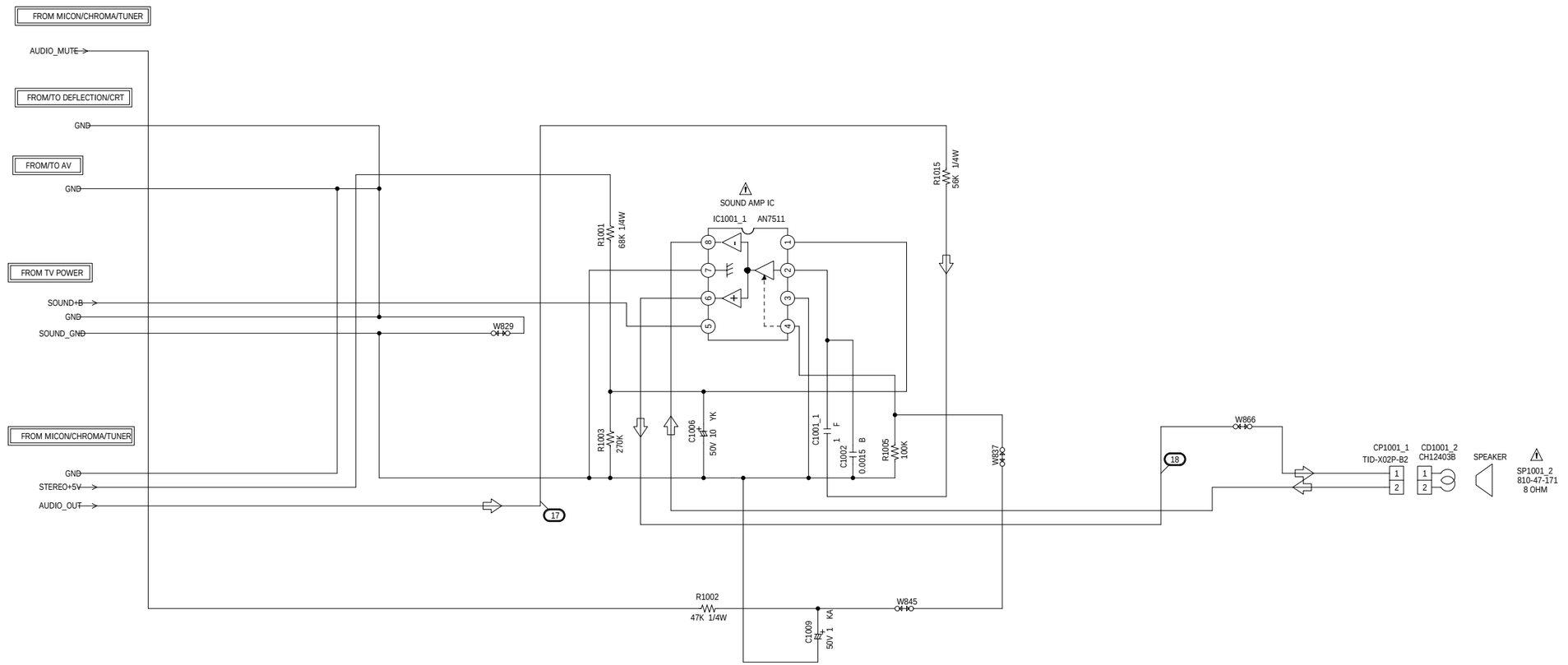
NOTE: THE DC VOLTAGE AT EACH PART WAS MEASURED WITH THE DIGITAL TESTER WHEN THE COLOR BROADCAST WAS RECEIVED IN GOOD CONDITION AND PICTURE IS NORMAL.

NOTE: THIS SCHEMATIC DIAGRAM IS THE LATEST AT THE TIME OF PRINTING AND SUBJECT TO CHANGE WITHOUT NOTICE 。

ATTENTION: LES PIECES REPAREES PAR UN ⚠ ETANT DANGEREUSES AN POINT DE VUE SECURITE N'UTILISER QUE CELLS DECRITES DANS LA NOMENCLATURE DES PIECES。

CAUTION SINCE THESE PARTS MARKED BY ⚠ ARE CRITICAL FOR SAFETY,USE ONES DESCRIBED IN PARTS LIST ONLY 。

SOUND SCHEMATIC DIAGRAM
(MAIN PCB)



PCB010
TMC563

NOTE: THIS SCHEMATIC DIAGRAM IS THE LATEST AT THE TIME OF PRINTING AND SUBJECT TO CHANGE WITHOUT NOTICE。

NOTE: THE DC VOLTAGE AT EACH PART WAS MEASURED WITH THE DIGITAL TESTER WHEN THE COLOR BROADCAST WAS RECEIVED IN GOOD CONDITION AND PICTURE IS NORMAL.

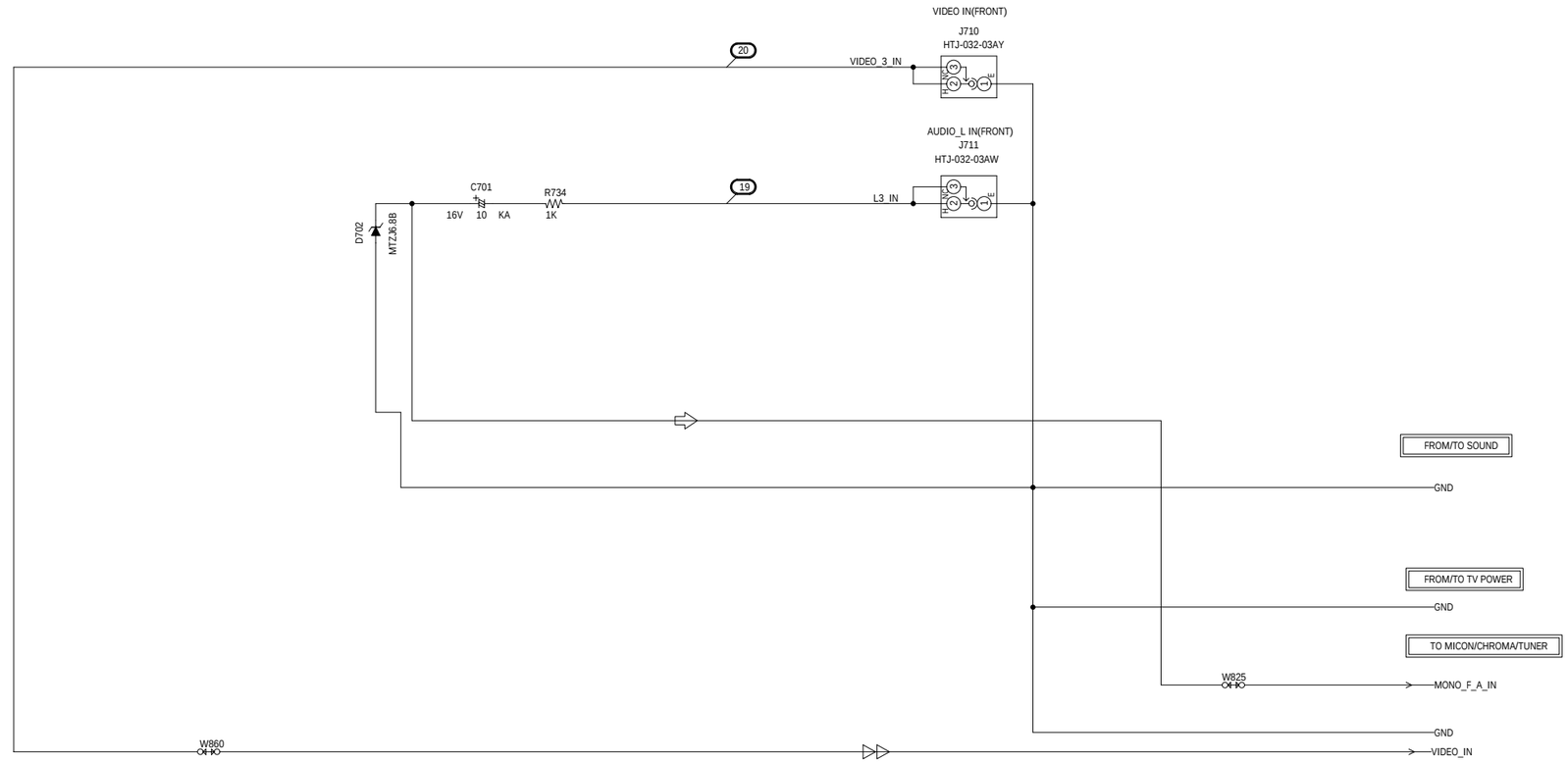
CAUTION SINCE THESE PARTS MARKED BY ⚠ ARE CRITICAL FOR SAFETY, USE ONES DESCRIBED IN PARTS LIST ONLY 。

ATTENTION: LES PIECES REPAREES PAR UN ⚠ ETANT DANGEREUSES AN POINT DE VUE SECURITE N'UTILISER QUE CELLS DECRITES DANS LA NOMENCLATURE DES PIECES。

⇦ AUDIO SIGNAL

AV SCHEMATIC DIAGRAM

(MAIN PCB)



PCB010
TMC563

NOTE:THE DC VOLTAGE AT EACH PART WAS MEASURED
WITH THE DIGITAL TESTER WHEN THE COLOR BROADCAST
WAS RECEIVED IN GOOD CONDITION AND PICTURE IS NORMAL.

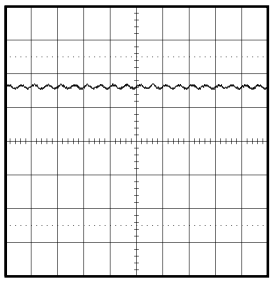
NOTE: THIS SCHEMATIC DIAGRAM IS THE LATEST AT THE TIME
OF PRINTING AND SUBJECT TO CHANGE WITHOUT NOTICE。

AUDIO SIGNAL

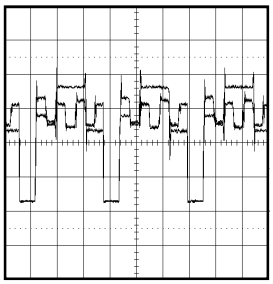
TUNER VIDEO SIGNAL

WAVEFORMS

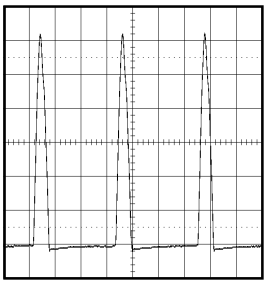
MICON/CHROMA/TUNER



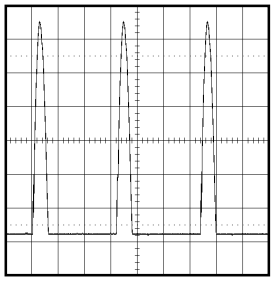
① 0.5V 2ms/div



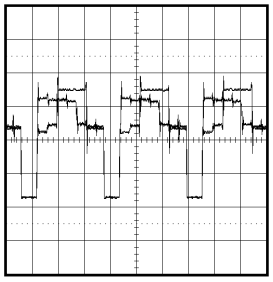
⑥ 1V 20µs/div



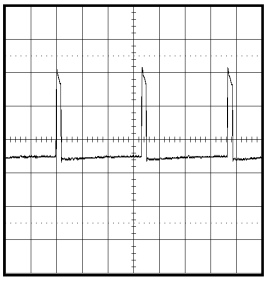
⑪ 200V 20µs/div



② 20V 20µs/div

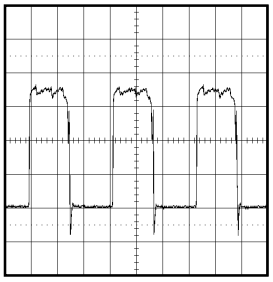


⑦ 1V 20µs/div

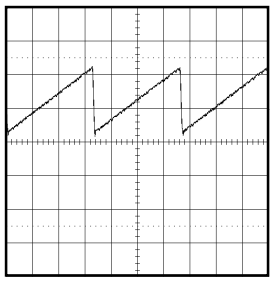


⑫ 10V 5ms/div

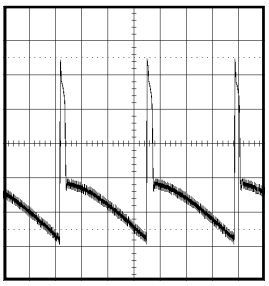
DEFLECTION/CRT



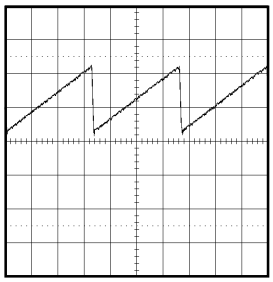
③ 200mV 20µs/div



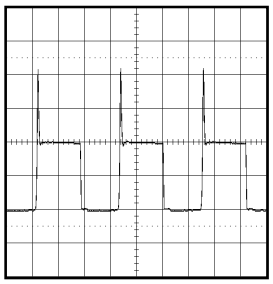
⑧ 0.5V 5ms/div



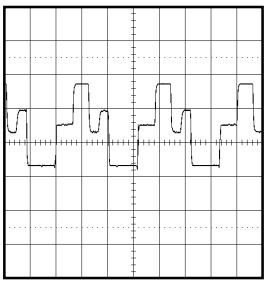
⑬ 10V 5ms/div



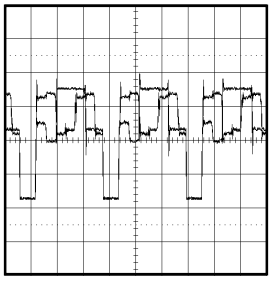
④ 0.5V 5ms/div



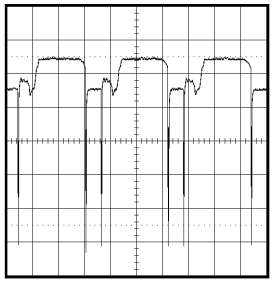
⑨ 20V 20µs/div



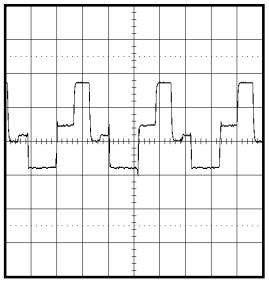
⑭ 50V 20µs/div



⑤ 1V 20µs/div



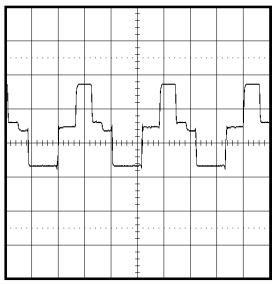
⑩ 2V 20µs/div



⑮ 50V 20µs/div

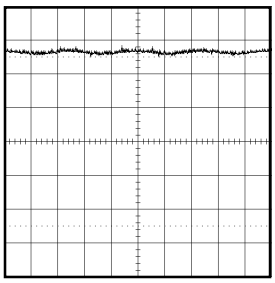
NOTE: The following waveforms were measured at the point of the corresponding balloon number in the schematic diagram.

WAVEFORMS

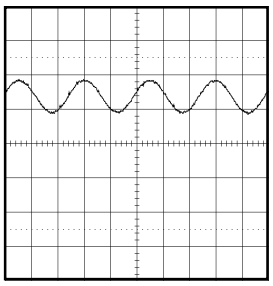


⑯ 50V 20µs/div

SOUND

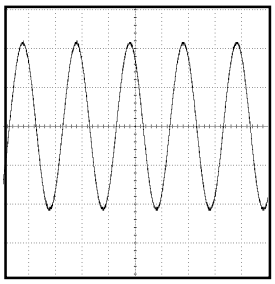


⑰ 0.5V 1ms/div

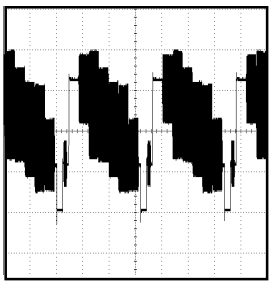


⑱ 1V 1ms/div

AV



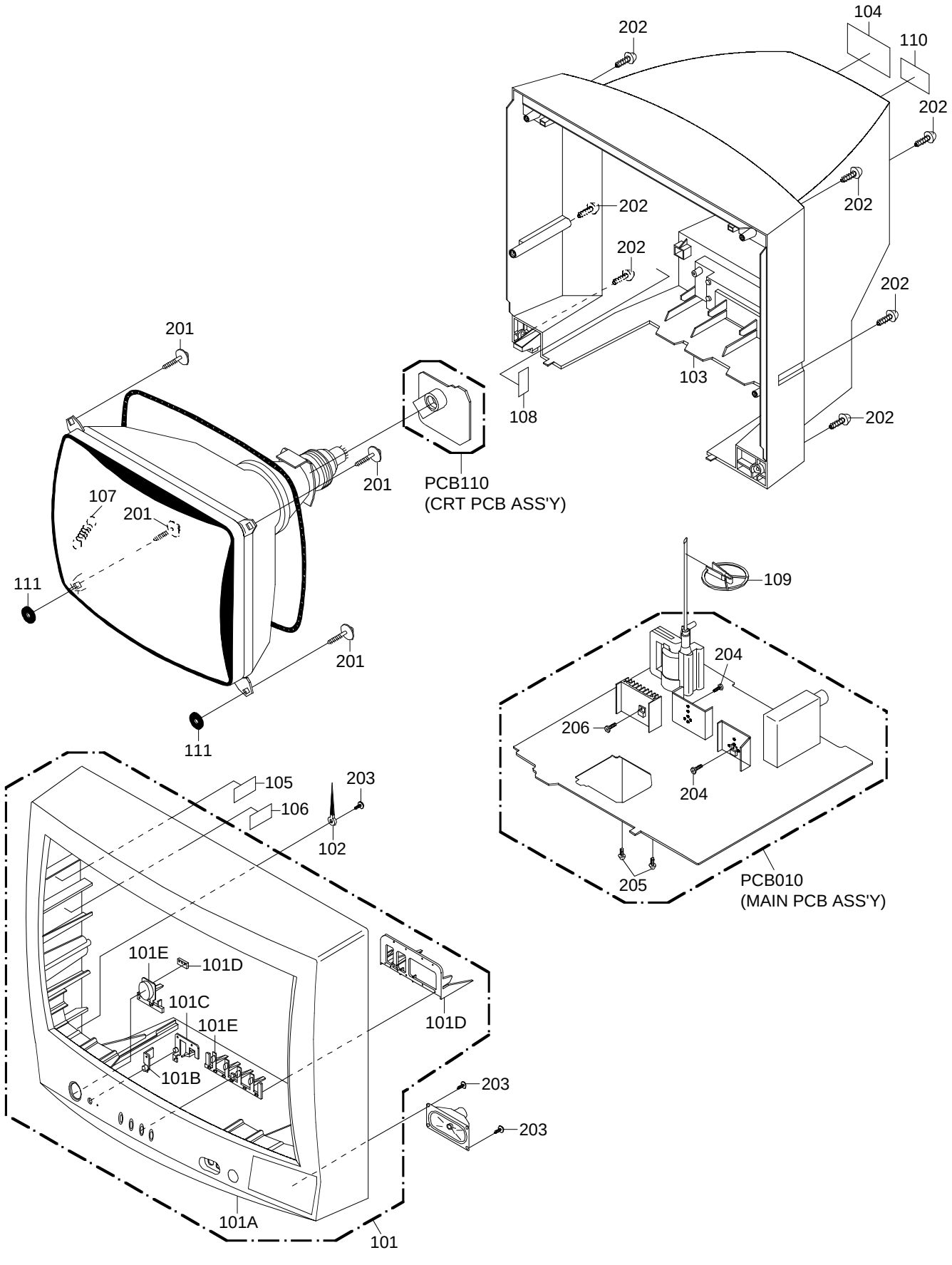
⑲ 200mV 500µs/div



⑳ 500mV 20µs/div

NOTE: The following waveforms were measured at the point of the corresponding balloon number in the schematic diagram.

MECHANICAL EXPLODED VIEW



MECHANICAL REPLACEMENT PARTS LIST

Location No.	TSB P/N	Reference No.	Description	
101	AD302337	A3M903A720	CABINET,FRONT ASSY	
101A	AD301497	701WPJB758	CABINET,FRONT	
101B	AD301498	711WPA0173	PLATE,FRONT	
101C	AD301499	713WPA0214	GUIDE,REMOCON	
101D	AD301500	735WPA0670	BUTTON,BASE	
101E	AD301501	735WPBA435	BUTTON,FRAME	
102	BZ710039	8995034000	CORD CLIP UL CO.	
103	AE000747	A3M903A740	CABINET,BACK ASSY	
104	AD302339	722549A172	SHEET,RATING	
105	AD300132	7230006818	SHEET,CAUTION	
106	AE000007	7220001107	SHEET,HWC	
107	BZ710258	741WUA0001	SPRING,EARTH	
108	AE000006	7220001119	SHEET,CSA WARNING	
109	BZ710260	899HV3T000	HOLDER,ANODE WIRE	
110	AD302152	726000A040	SHEET,CRT NO.	
111	AD301899	800WR0A003	SHEET,CRT SUPPORT	
201	BZ710275	8121J50B54	SCREW,TAP TITE(P) GW20	5x28
202	BZ710035	8117540A64	SCREW,TAPPING(B0) TRUSS	4x16
203	BZ710031	8110630A04	SCREW,TAP TITE(P) BRAZIER	3x10
204	BZ710239	8109I30A04	SCREW,TAP TITE(B) WH7	3x10
205	BZ710019	8109630802	SCREW,TAP TITE(B) BRAZIER	3x8
206	BZ710018	8107630804	SCREW,TAP TITE(S) BRAZIER	3x8
---	AE000748	723000C255	SHEET,BAR CODE	
---	AE000010	791WHA0085	LAMIFILM,BAG	
---	AD301504	792WHA0379	PACKAGE,TOP	
---	AD301505	792WHA0380	PACKAGE,BOTTOM	
---	AD302340	793WCDB656	GIFT BOX	
---	AD302341	A3M903A975	INSTRUCTION BOOK KIT	
---	AD300436	J3I70416	IMPORTANT SAFETY INSTRUCTIONS	
---	AD300022	J3I70417	REGISTRATION CARD	
---	AD300023	J3I70436	ESP CARD	
---	AD302342	J3M90301A	INSTRUCTION BOOK	
---	AD300812	JB5UD400	POLYBAG,INSTRUCTION(RED CAUTION)	

ELECTRICAL REPLACEMENT PARTS LIST

Location No.	TSB P/N	Reference No.		Description
		RESISTORS		
⚠R401	AD300783	R3X181221J	R,METAL OXIDE	220 OHM 1W
⚠R402	AE000676	R3K181102J	R,METAL	1K OHM 1W
⚠R408	AD301014	R4X5T6472F	R,METAL	4.7K OHM 1/6W
⚠R409	AD300037	R4X5T6153F	R,METAL	15K OHM 1/6W
⚠R424	BZ210105	R4X5T6183F	R,METAL	18K OHM 1/6W
⚠R429	BZ210046	R6558A1R8J	R,FUSE	1.8 OHM 2W
⚠R450	BZ210246	R3X18A181J	R,METAL OXIDE	180 OHM 2W
⚠R500	BZ210080	R0G3K2275K	RC	2.7M OHM 1/2W
⚠R501	AD300720	R5X2AE1R2J	R,CEMENT	1.2 OHM 7W
⚠R502	BZ210190	R63581R22J	R,FUSE	0.22 OHM 1W
⚠R514	BZ210166	R002T4562J	RC	5.6K OHM 1/4W
⚠R517	BZ210111	R3X28B3R3J	R,METAL	3.3 OHM 3W
⚠R520	BZ210206	R002T2155J	RC	1.5M OHM 1/2W
⚠R524	BZ210083	R3X28A010J	R,METAL OXIDE	1 OHM 2W
⚠R542	AD301143	R3X181R27J	R,METAL OXIDE	0.27 OHM 1W
⚠R543	AD301016	R3X28A331J	R,METAL OXIDE	330 OHM 2W
R629	AD301433	R3X18A120J	R,METAL OXIDE	12 OHM 2W
⚠R803	BZ210050	R3X18A123J	R,METAL OXIDE	12K OHM 2W
⚠R805	BZ210050	R3X18A123J	R,METAL OXIDE	12K OHM 2W
⚠R807	BZ210050	R3X18A123J	R,METAL OXIDE	12K OHM 2W
		CAPACITORS		
C402	BZ110202	C0PLRR713K	CC	0.001 UF 2KV R
⚠C414	AD301434	E02LU4101M	CE	100 UF 35V
C418	BZ110053	E02LF3102M	CE	1000 UF 25V
⚠C433	BZ110149	E02LT4471M	CE	470 UF 35V
⚠C434	BZ110195	E02LU8220M	CE	22 UF 100V
⚠C437	BZ110026	P411F3334J	CMPP	0.33 UF 250V ECWF
⚠C443	AD302292	P4N8FJ912H	CMPP	0.0091UF 1.25KV
⚠C448	BZ110204	E0ELFD220M	CE	22 UF 250V
⚠C501	AD300925	E02LT2102M	CE	1000 UF 16V
C502	AD300078	C0JBB0713K	CC	0.001 UF 2KV B
C503	AD300078	C0JBB0713K	CC	0.001 UF 2KV B
⚠C505	BZ110025	P2122B224M	CMP	0.22 UF 275V ECQUL
⚠C506	BZ110035	P2122B104M	CMP	0.1 UF 275V ECQUL
⚠C507	AD301635	E51CGC331M	CE	330 UF 200V
C514	AD301320	C0PLRR7U2K	CC	680 PF 2KV R
C517	AD301702	C0PLRR7G3K	CC	0.0018 UF 2KV R
⚠C518	AD301108	CD39E0MH3M	CC	0.0022UF 250V
⚠C521	AD300060	E62NFB101M	CE	100 UF 160V
⚠C530	AD301026	CD39E0M13M	CC	0.001 UF 250V
⚠C531	AD300925	E02LT2102M	CE	1000 UF 16V
⚠C533	AD301026	CD39E0M13M	CC	0.001 UF 250V
C802	AD300078	C0JBB0713K	CC	0.001 UF 2KV B
		DIODES		
D001	BZ410037	D97U03301B	DIODE,ZENER	MTZJ33B T-77
D106	BZ410054	0021721150	LED	SLR-342VCT32
D402	BZ410123	D2W0011E10	DIODE,SILICON	11E1-B-EIC
⚠D404	BZ410020	D97U05R11B	DIODE,ZENER	MTZJ5.1B T-77
⚠D405	BZ410066	D97U06R21B	DIODE,ZENER	MTZJ6.2B T-77
D406	BZ410123	D2W0011E10	DIODE,SILICON	11E1-B-EIC
⚠D407	AD300731	D2WXN49370	DIODE,SILICON	1N4937
⚠D410	AD300731	D2WXN49370	DIODE,SILICON	1N4937
⚠D411	AD300731	D2WXN49370	DIODE,SILICON	1N4937
D412	BZ410043	D2WT011E10	DIODE,SILICON	11E1-EIC
D418	BZ410019	D97U03001B	DIODE,ZENER	MTZJ30B T-77
D419	BZ410019	D97U03001B	DIODE,ZENER	MTZJ30B T-77
⚠D501	BZ410062	D2WTRM11C0	DIODE,SILICON	RM11C-EIC
⚠D502	BZ410062	D2WTRM11C0	DIODE,SILICON	RM11C-EIC
⚠D503	BZ410062	D2WTRM11C0	DIODE,SILICON	RM11C-EIC
⚠D504	BZ410062	D2WTRM11C0	DIODE,SILICON	RM11C-EIC
D506	AD300671	D97U01801B	DIODE,ZENER	MTZJ18B T-77
D508	BZ410006	D1VT001330	DIODE,SILICON	1SS133T-77
⚠D509	AD300671	D97U01801B	DIODE,ZENER	MTZJ18B T-77
⚠D510	AD300076	D28F30DF60	DIODE,RECTIFIER	30DF6-FC
⚠D514	BZ410077	D2WXSB1400	DIODE,SCHOTTKY	SB140-EIC
D515	BZ410006	D1VT001330	DIODE,SILICON	1SS133T-77
D517	AD300731	D2WXN49370	DIODE,SILICON	1N4937
D519	BZ410076	D2WXB290S0	DIODE,SILICON	SB290S
D520	BZ410006	D1VT001330	DIODE,SILICON	1SS133T-77
D521	BZ410006	D1VT001330	DIODE,SILICON	1SS133T-77
D523	AD300731	D2WXN49370	DIODE,SILICON	1N4937

ELECTRICAL REPLACEMENT PARTS LIST

Location No.	TSB P/N	Reference No.	Description	
		DIODES		
D524	BZ410064	D97U03R91B	DIODE,ZENER	MTZJ3.9B T-77
D526	BZ410006	D1VT001330	DIODE,SILICON	1SS133T-77
D527	BZ410020	D97U05R11B	DIODE,ZENER	MTZJ5.1B T-77
D528	BZ410021	D97U05R61B	DIODE,ZENER	MTZJ5.6B T-77
D603	BZ410006	D1VT001330	DIODE,SILICON	1SS133T-77
D604	BZ410058	D97U08R21B	DIODE,ZENER	MTZJ8.2B T-77
D606	BZ410043	D2WT011E10	DIODE,SILICON	11E1-EIC
D702	BZ410022	D97U06R81B	DIODE,ZENER	MTZJ6.8B T-77
D804	BZ410006	D1VT001330	DIODE,SILICON	1SS133T-77
D805	BZ410006	D1VT001330	DIODE,SILICON	1SS133T-77
D806	BZ410006	D1VT001330	DIODE,SILICON	1SS133T-77
		ICS		
IC101	AD302159	I56F07091A	IC	OEC7091A
IC199	AE000749	A3M903A015	IC	S-24C04BDP-LA
⚠IC401	BZ611053	I01TD55220	IC	AN5522
⚠IC501	BZ410088	0002E00610	PHOTO COUPLER	LTV-817M-VB
⚠IC1001	BZ611001	I01DP75110	IC	AN7511
		TRANSISTORS		
Q105	BZ510086	TPATB03003	COMPOUND TRANSISTOR	KRA102MAT
Q401	BZ510028	TDUF024990	TRANSISTOR,SILICON	2SD2499
⚠Q402	BZ510089	TC5T01627Y	TRANSISTOR,SILICON	2SC1627_Y(TPE2)
Q501	BZ510093	TJXG5NC500	FET	STP5NC50FP
Q502	BZ510070	TCAT032034	TRANSISTOR,SILICON	KTC3203_Y-AT
⚠Q503	BZ510004	TA3T016240	TRANSISTOR,SILICON	2SA1624-AA
Q504	BZ510069	TCATC31980	TRANSISTOR,SILICON	KTC3198-AT(Y,GR)
Q507	BZ510069	TCATC31980	TRANSISTOR,SILICON	KTC3198-AT(Y,GR)
Q601	BZ510070	TCAT032034	TRANSISTOR,SILICON	KTC3203_Y-AT
Q602	BZ510070	TCAT032034	TRANSISTOR,SILICON	KTC3203_Y-AT
Q603	BZ510070	TCAT032034	TRANSISTOR,SILICON	KTC3203_Y-AT
Q606	BZ510070	TCAT032034	TRANSISTOR,SILICON	KTC3203_Y-AT
Q607	BZ510069	TCATC31980	TRANSISTOR,SILICON	KTC3198-AT(Y,GR)
Q609	BZ510069	TCATC31980	TRANSISTOR,SILICON	KTC3198-AT(Y,GR)
Q610	BZ510070	TCAT032034	TRANSISTOR,SILICON	KTC3203_Y-AT
⚠Q804	BZ510091	TCA0042170	TRANSISTOR,SILICON	KTC4217(O,Y)
⚠Q805	BZ510091	TCA0042170	TRANSISTOR,SILICON	KTC4217(O,Y)
⚠Q806	BZ510091	TCA0042170	TRANSISTOR,SILICON	KTC4217(O,Y)
		COILS &TRANSFORMERS		
L401	BZ310063	022100027A	COIL,LINEARITY	ELH5L4113
⚠L501	AD301395	029T000104	COIL,LINE FILTER	1R0A562F20
⚠L503	BZ310033	028R200026	COIL,DEGAUSS	8R200026
T401	BZ310157	045009003J	TRANS,HORIZONTAL DRIVE	ETH09K14BZ
⚠T501	AD302296	0481291144	TRANSFORMER,SWITCHING	81291144
		JACKS		
J710	AD300110	060G401047	RCA JACK	HTJ-032-03AY
J711	AD300111	060G401046	RCA JACK	HTJ-032-03AW
⚠J801	AD301356	066F130020	SOCKET,CATHODE RAY,TUBE	ISHS53S
		SWITCHES		
SW101	BZ612010	0504101T34	SWITCH,TACT	EVQ21505R
SW102	BZ612010	0504101T34	SWITCH,TACT	EVQ21505R
SW103	BZ612010	0504101T34	SWITCH,TACT	EVQ21505R
SW104	BZ612010	0504101T34	SWITCH,TACT	EVQ21505R
SW105	BZ612010	0504101T34	SWITCH,TACT	EVQ21505R
		VARIABLE RESISTORS		
VR401	BZ210238	V1K6313BTE	VOLUME,SEMI FIXED	NVG6TLTAB102
VR402	BZ210237	V1K63Q4BTE	VOLUME,SEMI FIXED	NVG6TLTAB473
VR502	BZ210108	V116313BTC	VOLUME,SEMI FIXED	EVNCYAA03B13
		P.C.BOARD ASSEMBLIES		
PCB010	AD302335	A3M903A010	PCB ASS'Y	TMC563A
PCB110	AD302336	A3M903A110	PCB ASS'Y	TCC425A
		MISCELLANEOUS		
B501	BZ310200	024H003553	CORE,BEADS	W5RH3.5X5X1.0
B503	BZ310121	024HT03553	CORE,BEADS	W5RH3.5X5X1.0
B504	BZ310121	024HT03553	CORE,BEADS	W5RH3.5X5X1.0
BT001	AE000012	1412004008	BATTERY,MANGAN	R03(AB)E_2P_G
BT002	AE000012	1412004008	BATTERY,MANGAN	R03(AB)E_2P_G
⚠CD501	BZ614407	120R415906	CORD,AC BUSH	0R415906
CD801	BZ614175	06CU82039A	CORD,CONNECTOR	SM1098-009-1A
CD802	AE000677	WDL6046038	FLAT CABLE AWM2468 A	WG26 6C BLACK 460MM
CD803	AD301450	WBL6032038	FLAT CABLE AWM2468 A	WG26 4C BLACK 320MM
⚠CP401	BZ614303	069S450089	CONNECTOR PCB SIDE	A1561WV2-A5P
CP402	BZ614444	069D01001A	CONNECTOR PCB SIDE	003P-2100

ELECTRICAL REPLACEMENT PARTS LIST

Location No.	TSB P/N	Reference No.	Description	
		MISCELLANEOUS		
⚠CP502	AD300687	069S420110	CONNECTOR PCB SIDE	A1561WV2-2P
CP601	BZ614102	0694270139	CONNECTOR PCB SIDE	173979-7
CP801	BZ614269	069S320010	CONNECTOR PCB SIDE	A2361WV2-2P
CD1001	AD301494	06CH12403B	CORD,CONNECTOR	CH12403B
CP1001	AD301495	069W120019	CONNECTOR PCB SIDE	TID-X02P-B2
CP802A	BZ614333	067U006049	WIRE HOLDER	B2013H02-6P
CP802B	BZ614333	067U006049	WIRE HOLDER	B2013H02-6P
CP803A	BZ614334	067U004029	WIRE HOLDER	B2013H02-4P
CP803B	BZ614334	067U004029	WIRE HOLDER	B2013H02-4P
EL001	BZ614043	124116281A	EYE LET	XRY16X28BD
EL002	BZ614044	124120301A	EYE LET	XRY20X30BD
⚠F501	AD301046	081PC6R305	FUSE	51MS063L
⚠FB401	AD302299	043221012F	TRANSFORMER,FLYBACK	FQI-21B002
FH501	BZ614005	06710T0006	HOLDER,FUSE	EYF-52BC
FH502	BZ614005	06710T0006	HOLDER,FUSE	EYF-52BC
OS101	AD301048	0773071001	REMOTE RECEIVER	RPM7138-H5
⚠RY501	AD300114	0560V20115	RELAY	ALKS321
⚠SP1001	BZ614029	070C533008	SPEAKER	810-47-171
⚠TH501	AD302000	D8EE0B1400	DEGAUSS ELEMENT	B59203-S1060-B14
TM101	AD301335	076N0EH020	TRANSMITTER	RC-EH020
⚠TU001	AD302169	0163100002	RF UNIT	ENG36A01G
⚠V801	AD302300	098Q210449	CRT W/DY	A51AEZ90X24
X601	AD302003	100CT3R505	CRYSTAL	HC-49/C

RESISTOR

RC.....	CARBON RESISTOR

CAPACITORS

CC.....	CERAMIC CAPACITOR
CE.....	ALUMI ELECTROLYTIC CAPACITOR
CP.....	POLYESTER CAPACITOR
CPP.....	POLYPROPYLENE CAPACITOR
CPL.....	PLASTIC CAPACITOR
CMP.....	METAL POLYESTER CAPACITOR
CMPL.....	METAL PLASTIC CAPACITOR
CMPP.....	METAL POLYPROPYLENE CAPACITOR

TOSHIBA CORPORATION
1-1, SHIBAURA 1-CHOME, MINATO-KU, TOKYO 105-8001, JAPAN